UNIVERSITY AT ALBANY
State University of New York

Office of the Senior Vice President for Academic Affairs &
Provost

May 11, 2018

Dr. Jinliu (Grace) Wang
Interim Provost and Vice Chancellor for Academic Affairs
State University of New York
State University Plaza
Albany, NY 12246

Dear Dr. Wang,

On behalf of the faculty at the University at Albany, I am pleased to submit for establishment and registration the attached New Undergraduate Degree Program Proposal for a B.S. in Environmental and Sustainable Engineering.

This proposal has been fully considered and approved through our campus governance system and has completed the required external program review. Should there be a need for additional information or clarification to facilitate processing, please contact Celine LaValley at clavalley@albany.edu.

Thank you for your consideration and assistance.

Sincerely,

James R. Stellar
Provost and Senior Vice President for Academic Affairs

Attachment

c. Vice Provost Jeanette Altarriba, Undergraduate Education
Dean Kim Boyer, College of Engineering and Applied Sciences
Chair Yanna Liang, Department of Environmental and Sustainable Engineering

University Hall, 308
1400 Washington Avenue, Albany, New York 12222
PH: 518-956-8030 FX: 518-956-8043
www.albany.edu

New Program Proposal: Undergraduate Degree Program

Form 2A

Version 2017-08-28

This form should be used to seek SUNY's approval and New York State Education Department's (SED) registration of a proposed new academic program leading to an associate and/or bachelor's degree. Approval and registration are both required before a proposed program can be promoted or advertised, or can enroll students. The campus Chief Executive or Chief Academic Officer should send a signed cover letter and this completed form (unless a different form applies[1]), which should include appended items that may be required for Sections 1 through 6, 9 and 10 and MPA-1 of this form, to the SUNY Provost at *program.review@suny.edu*. The completed form and appended items should be sent as a single, continuously paginated document.[2] If Sections 7 and 8 of this form apply, External Evaluation Reports and a single Institutional Response should also be sent, but in a separate electronic document. Guidance on academic program planning is available here.

Table of Contents

NOTE: Please update this Table of Contents automatically after the form has been completed. *To do this, put the cursor anywhere over the Table of Contents, right click, and, on the pop-up menus, select "Update Field" and then "Update Page Numbers Only." The last item in the Table of Contents is the List of Appended and/or Accompanying Items, but the actual appended items should continue the pagination.*

[1]Use a **different form** if the proposed new program will lead to a graduate degree or any credit-bearing certificate; be a combination of existing registered programs (i.e. for a multi-award or multi-institution program); be a breakout of a registered track or option in an existing registered program; or **lead to certification as a classroom teacher, school or district leader, or pupil personnel services professional** (e.g., school counselor).

[2]This email address limits attachments to 25 MB. If a file with the proposal and appended materials exceeds that limit, it should be emailed in parts.

Section 1. General Information

a) Institutional Information	*Date of Proposal:*	May 8, 2018
	Institution's 6-digit SED Code:	210500
	Institution's Name:	University at Albany
	Address:	1400 Washington Avenue Albany NY 12222
	Dept of Labor/Regent's Region:	Capital Region
b) Program Locations	*List each campus where the entire program will be offered (with each institutional or branch campus 6-digit SED Code):* 210500	
	List the name and address of off-campus locations (i.e., extension sites or extension centers) where courses will offered, ***or check here [X] if not applicable****:*	
c) Proposed Program Information	*Program Title:*	Environmental and Sustainable Engineering
	Award(s) (e.g., A.A., B.S.):	B.S.
	Number of Required Credits:	*Minimum [128] If tracks or options, largest minimum [ ]*
	Proposed HEGIS Code:	0922
	Proposed 6-digit CIP 2010 Code:	14.1401
	If the program will be accredited, list the accrediting agency and expected date of accreditation: ABET, application for accreditation 2020	
	If applicable, list the SED professional licensure title(s)[3] to which the program leads: Professional Engineer	
d) Campus Contact	*Name and title:* Celine LaValley, Assistant to the Dean *Telephone:* 518-442-3941 *E-mail:* clavalley@albany.edu	
e) Chief Executive or Chief Academic Officer Approval	***Signature affirms that the proposal has met all applicable campus administrative and shared governance procedures for consultation, and the institution's commitment to support the proposed program. E-signatures are acceptable.*** *Name and title:* James R. Stellar, Ph. D. Provost and Senior Vice President for Academic Affairs *Signature and date:* 5/11/18	
	If the program will be registered jointly[4] with one or more other institutions, provide the following information for <u>each</u> institution:	
	Partner institution's name and 6-digit SED Code: *Name, title, and signature of partner institution's CEO (or* ***append*** *a signed letter indicating approval of this proposal):*	

[3] If the proposed program leads to a professional license, a specialized form for the specific profession may need to accompany this proposal.

[4] If the partner institution is non-degree-granting, see SED's CEO Memo 94-04.

Attestation and Assurances

On behalf of the institution, I hereby attest to the following:

That all educational activities offered as part of this proposed curriculum are aligned with the institutions' goals and objectives and meet all statutory and regulatory requirements, including but not limited to Parts 50, 52, 53 and 54 of the Rules of the Board of Regents and the following specific requirements:

That credit for study in the proposed program will be granted consistent with the requirements in §50.1(o).

That, consistent with §52.1(b)(3), a reviewing system has been devised to estimate the success of students and faculty in achieving the goals and objectives of the program, including the use of data to inform program improvements.[5]

That, consistent with §52.2(a), the institution possesses the financial resources necessary to accomplish its mission and the purposes of each registered program, provides classrooms and other necessary facilities and equipment as described in §52.2(a)(2) and (3), sufficient for the programs dependent on their use, and provides libraries and library resources and maintains collections sufficient to support the institution and each registered curriculum as provided in §52.2(a)(4), including for the program proposed in this application.

That, consistent with 52.2(b), the information provided in this application demonstrates that the institution is in compliance with the requirements of §52.2(b), relating to faculty.

That all curriculum and courses are offered and all credits are awarded, consistent with the requirements of §52.2(c).

That admissions decisions are made consistent with the requirements of §52.2(d)(1) and (2) of the Regulations of the Commissioner of Education.

That, consistent with §52.2(e) of the Regulations of the Commissioner of Education: overall educational policy and its implementation are the responsibility of the institution's faculty and academic officers, that the institution establishes, publishes and enforces explicit policies as required by §52.2(e)(3), that academic policies applicable to each course as required by §52.2(e)(4), including learning objectives and methods of assessing student achievement, are made explicit by the instructor at the beginning of each term; that the institution provides academic advice to students as required by §52.2(e)(5), that the institution maintains and provides student records as required by §52.2(e)(6).

That, consistent with §52.2(f)(2) of the Regulations of the Commissioner of Education, the institution provides adequate academic support services and that all educational activities offered as part of a registered curriculum meet the requirements established by state, the Rules of the Board of Regents and Part 52 of the Commissioner's regulations.

CHIEF ADMINISTRATIVE or ACADEMIC OFFICER/ PROVOST	
Signature	Date 5/11/18
Type or print the name and title of signatory	Phone Number 518-956-8030
Dr. James R. Stellar, Provost and Senior Vice President for Academic Affairs	

[5] The NY State Education Department reserves the right to request this data at any time and to use such data as part of its evaluation of future program registration applications submitted by the institution.

Section 2. Program Information

2.1. Program Format

Check all SED-defined formats, mode and other program features that apply to the **entire program**.

a) Format(s): [ ]Day [ ]Evening [ ]Weekend [ ]Evening/Weekend [ ]Not Full-Time

b) Modes: [ ]Standard [ ]Independent Study [ ]External [ ]Accelerated [ ]Distance Education
NOTE: *If the program is designed to enable students to complete 50% or more of the course requirements through distance education, check Distance Education, see Section 10, and* ***append*** *a Distance Education Format Proposal.*

c) Other: [ ] Bilingual [ ] Language Other Than English [ ] Upper Division [ ] Cooperative [ ] 4.5 year [ ] 5 year

2.2. Related Degree Program

NOTE: *This section is not applicable to a program leading to an associate's or a bachelor's degree.*

2.3. Program Description, Purposes and Planning

a) What is the description of the program as it will appear in the institution's catalog?

Environmental and Sustainable Engineering is a discipline that builds on knowledge, discovery, and information from math and basic sciences to solve critical environmental problems at the national and global scales. Basic sciences, such as chemistry, biology, physics, atmospheric science, social science, economics, geography and planning, and political science provide a solid foundation for this multidisciplinary engineering program. Standing on this broad foundation, faculty and students in this program are able to tackle traditional environmental problems associated with air pollution and prevention, water and wastewater treatment and reuse, water resource management, soil and groundwater clean-up, and hazardous waste remediation. In addition, the Environmental and Sustainable Engineering distinguishes itself from conventional Environmental Engineering by having a serious emphasis, long-term vision, and deep commitment to sustainable engineering. In particular, this program aims to address global environmental issues, provide sustainable designs for natural and engineered environments, and promote sustainability in all areas related to the environment and human health.

The Environmental and Sustainable Engineering curriculum comprises four interconnected cores. First, students are required to take 42 credits of math and basic sciences including biology, chemistry, and physics. These courses serve as the foundational core for this program. Second, students need to take 38 credits of engineering core courses. These include basic engineering courses, such as Introduction to Engineering, Statics, Strength of Materials, and Fluid Mechanics. Once these courses are completed, students will be ready to take those specifically targeting air quality, water and wastewater treatment, water resource engineering, and hazardous waste remediation. Third, all students are required to have 20 credits on sustainable environment, human health, and computation. These courses are deemed an interdisciplinary core. Fourth, based on their interests, all students are required to take nine credits of electives from a list of nine courses spanning a broad range of topics.

Students enrolling in this Environmental and Sustainable Engineering program will be equipped with a strong foundation in this broad discipline, state-of-the-art technologies for solving environmental problems using sustainable approaches, and skills for lifelong learning. In addition, this curriculum gives students experiences in teamwork, leadership development, and opportunities to improve their oral, written, and visual skills. Graduates from this program are highly sought after for careers in industry, consulting, and government at local, state and federal levels. Some graduates may enter academia and research organizations if they pursue graduate studies beyond the Bachelor of Science. Prepared and educated by this program, graduates will embark on a journey that

solves challenging problems facing the environment, human health, and the society; a career that actively pursues sustainability through critical thinking and innovative solutions; and a life that diligently serves the local community and the broad society through integrity, professional excellence, and humility.

b) What are the program's educational and, if appropriate, career objectives, and the program's primary student learning outcomes (SLOs)? ***NOTE:*** *SLOs are defined by the Middle States Commission on Higher Education in the Characteristics of Excellence in Higher Education (2006) as "clearly articulated written statements, expressed in observable terms, of key learning outcomes: the knowledge, skills and competencies that students are expected to exhibit upon completion of the program."*

In support of ABET requirements, the Programmatic Educational Objectives for the Environmental and Sustainable Engineering program are:

- **a)** Graduates will be able to work collaboratively with people from other backgrounds to solve critical environmental problems through sustainable approaches.
- **b)** Graduates will excel in their chosen profession through lifelong learning and become leaders in their professional service.
- **c)** Graduates will maintain high professional and ethical standards and stand out as examples for their peers.
- **d)** Graduates will become exemplary citizens by serving their local community and the broad society.

The Student Learning Outcomes of the Environmental and Sustainable Engineering program are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

c) How does the program relate to the institution's and SUNY's mission and strategic goals and priorities? What is the program's importance to the institution, and its relationship to existing and/or projected programs and its expected impact on them? As applicable, how does the program reflect diversity and/or international perspectives? For doctoral programs, what is this program's potential to achieve national and/or international prominence and distinction?

According to the Strategic draft framework, the mission of the University at Albany is: To generate and disseminate knowledge, serve as an engine of opportunity, cultivate inclusive excellence and global competence, and serve our communities.

Mission statement for the SUNY (https://www.suny.edu/about/mission/) is that: the state university system shall be to provide to the people of New York educational services of the highest quality, with the broadest possible access, fully representative of all segments of the population in a complete range of academic, professional and vocational postsecondary programs including such additional activities in pursuit of these objectives as are necessary or customary. These services and activities shall be offered through a geographically distributed comprehensive system of diverse campuses which shall have differentiated and designated missions designed to provide a comprehensive program of higher education, to meet the needs of both traditional and non-traditional students and to address local, regional and state needs and goals.

The mission of the Environmental and Sustainable Engineering program is to: (1) create and maintain a welcoming, uplifting, and inspiring environment for students, faculty and staff; (2) equip and train our students to be critical thinkers, problem solvers, and leaders in their professions, who will contribute to the global society through their life-long learning, curiosity, and creativity; (3) inspire, encourage, and support faculty in their professional growth as educators and researchers; and (4) create, disseminate, and apply fundamental knowledge to the real world for bettering the human society locally and globally. Obviously, the mission of this program aligns seamlessly with those from UAlbany and SUNY as it focuses on providing quality education to students, encouraging faculty professional growth in teaching, research, and service, and promoting public engagement.

The mission of this program also fits tightly with the five core institutional priorities outlined by President Rodríguez: student success, research excellence, globalization, public engagement and community outreach, and diversity and inclusion. First, the Environmental and Sustainable Engineering will provide quality engineering education to students in the capital region and beyond. Currently, in this region, there is no public university offering this high-demand and high-growth program. Second, this program will recruit top-notch faculty who will conduct state-of-the-art research activities. Faculty research excellence will bring research experience to undergraduate students, enrich classroom teaching, enhance UAlbany's reputation, and in turn attract more and better domestic and international students to this institution. Third, environmental problems are global. They are not confined within a region. Thus, to truly solve pressing environmental issues we face today, the Environmental and Sustainable Engineering program will take a global approach by collaborating and working with people from different countries, different regions and provide sustainable solutions to world-wide concerns, such as climate change. Fourth, this program will engage the public on topics that they care about and educate the public on those they are not so aware. After all, every human being lives in one environment. And we all face the choice of making sustainable decisions on a daily basis. Fifth, different from other engineering disciplines, Environmental engineering is one of a few engineering disciplines that are attractive to women. In 2015, 49.7% of Bachelor's degrees went to women in this field. Thus, by offering this program, the diversity of students and faculty in the whole College of Engineering and Applied Sciences (CEAS) can be improved dramatically.

The Environmental and Sustainable Engineering program will collaborate with two existing Environmental programs: the Atmospheric and Environmental Sciences and Environmental Health Sciences. On one hand, courses at the undergraduate level can be shared. On the other hand, faculty will share resources and collaborate on research projects. In addition, research collaboration with researchers in Biological Sciences, Chemistry, Economics, Geography, Geology, Physics, Public Affairs and Policy, and Social Science will be pursued. Furthermore, since this program is completely new to UAlbany, experience gained from establishing this one will assist in starting other new programs, such as Biological Engineering, Chemical Engineering, and Civil Engineering in the near future. Limitless collaborations with these potential programs are beyond description here.

d) How were faculty involved in the program's design? Describe input by external partners, if any (e.g., employers and

institutions offering further education?

The Environmental and Sustainable Engineering program had just one faculty member hired at the time the proposal was developed. However, faculty members in the Department of Atmospheric and Environmental sciences, researchers in Atmospheric Science Research Center, faculty in the School of Public Health, colleagues in other College of Arts and Sciences departments, and the dean of CEAS all participated and contributed in some way. We also spent considerable time making a careful examination of other top-tier programs and engaged in discussions with colleagues at other research universities with strong environmental engineering programs.

e) How did input, if any, from external partners (e.g., educational institutions and employers) or standards influence the program's design? If the program is designed to meet specialized accreditation or other external standards, such as the educational requirements in Commissioner's Regulations for the Profession, **append** a side-by-side chart to show how the program's components meet those external standards. If SED's Office of the Professions requires a specialized form for the profession to which the proposed program leads, **append** a completed form at the end of this document.

We have carefully adhered to the standards set forth by ABET (Accreditation Board for Engineering and Technology). We have had some informal discussions and inquiries from industry (potential future partners), as well. The CEAS is establishing an advisory council that will include representatives from industry touching on all the disciplines we do or will offer, including environmental and sustainable engineering. We are populating that council now.

Please see **Appendix 1** for side-by-side chart of the accreditation requirements and program components.

f) Enter anticipated enrollments for Years 1 through 5 in the table below. How were they determined, and what assumptions were used? What contingencies exist if anticipated enrollments are not achieved?

Nationally, Environmental Engineering programs are typically a part of the Civil & Environmental Engineering program. They are generally small in size. Our estimation here is fairly conservative considering that: (1) this is a completely new program at UAlbany, (2) this program is housed in a brand-new College of Engineering and Applied Sciences; and (3) both this program and the College do not have much name recognition regionally and globally. In addition, this program has wet lab teaching sessions. Typically, one session accommodates 12-15 students. More students will require more sessions and more resources, such as facility and manpower. But we do expect that the enrollment will grow significantly once the program starts. If we cannot reach the anticipated enrollment target, university personnel related to this matter will work together to identify the reasons and remove any road blocks that may prevent students from enrolling and staying in this program. Any programmatic issues can be resolved quickly. Measures for increasing student enrollment and retention will be executed immediately after explanations are found.

Year	Anticipated Headcount Enrollment			Estimated FTE
	Full-time	Part-time	Total	
1	10	3	13	12
2	15	5	20	17
3	25	6	31	28
4	35	7	42	38
5	45	8	53	49

g) Outline all curricular requirements for the proposed program, including prerequisite, core, specialization (track, concentration), internship, capstone, and any other relevant component requirements, but do not list each General Education course.

Course Title	Credits
ESE Core Courses	**38**
IESE/ICEN 110 Intro to Engineering	2
IESE 2XX Statics	3
IESE 2XX Strength of Materials	3
IESE 3XX Fluid Mechanics	3
IESE 3XX Introduction to Environmental Engineering with lab	3
IESE 4XX Water Resource Engineering	3
IESE 4XX Hazardous Waste Management	3
IESE 4XX Water/Wastewater Treatment	3
IESE 4XX Air Pollution Control	3
IESE 4XX Capstone Senior Design	3
IESE 4XX Energy Engineering	3
IESE 4XX Advanced Wastewater Engineering	3
IESE 4XX Air Quality Modeling	3
Environmental Sciences	**6**
AATM 210 Atmospheric Structure Thermodynamics, and Circulation	3
AENV 250 Sustainable Development	3
Environmental Health Sciences	**6**
HSPH 321 Global Environmental Issues	3
HEHS 560 Sustainability, Green Design and Public Health	3
Computer Engineering	**8**
ICEN/ICSI 201 Introduction to Computer Sci	4
ICEN/ICSI 210 Discrete Structures	4

Course Title	Credits
Math and Sciences	**42**
AMAT 112 Calculus I	4
AMAT 113 Calculus II	4
AMAT 214 Calculus Several Variables	4
AMAT 311 Ordinary Differential Equations	3
AMAT 370 Probability and Statistics	3
ACHM 120 General Chemistry I	3
ACHM 124 General Chemistry I Lab	1
ACHM 121 General Chemistry II	3
ACHM 125 General Chemistry II Lab	1
ABIO 130 Biology I	3
ABIO 131 General Biology	3
ABIO 201 Intro to Biological Investigations I	1
ABIO 202 Intro to Biological Investigations II	1
APHY 140 or 142 Physics I: Mechanics	3
APHY 145 Physics Lab I	1
APHY 150 or 152 Physics II: Electromagnetism	3
APHY 155 Physics II Lab	1
ESE Electives	**9 cr. from**
AATM 200 Natural Disasters	3
AATM 301 Surface Hydrology and Hydrometeorology	3
AATM 304 Air Quality and Air Pollution Policy	3
AENV/AATM 315 Environmental Statistics and Computation	4
AGOG 496/AUSP 456 Geographic Information Systems	3
A USP 452 CADD in Planning	3
HSPH/HEHS 323 Environmental Laboratory Perspectives in Public Health	3
HEHS 520 Principles of Environmental Chemistry	3
IESE 4XX Groundwater Hydrology	3
Total major credits	**109**
Total Degree Requirements	**128**

h) Program Impact on SUNY and New York State

h)(1) ***Need:*** What is the need for the proposed program in terms of the clientele it will serve and the educational and/or economic needs of the area and New York State? How was need determined? Why are similar programs, if any, not meeting the need?

At present, as we face climate change, resource depletion, and increased frequency of natural disasters, we need Environmental and Sustainable Engineers more than ever before. Specific to the state of New York (NY), according to EPA's estimation (Clean watersheds need survey, EPA-830-R-15005, 2016), the $/capita need for treating wastewater in NY is the highest among all states. In addition, we need Environmental Engineers to clean up soil and groundwater that are contaminated by either well-known or emerging contaminants. One example is Saint Gobain Performance Plastics which was announced as a Superfund site by EPA on July 31st, 2017.

These needs are rightfully reflected by job growth predictions. According to the NYS Department of Labor, Environmental Engineers can expect job market growth exceeding 20% across the state, and greater than 12% nationally, in the next five years (table below). National projections for ten years are even more favorable, and with the challenges of global warming, infrastructure resilience, and energy management, continued growth in demand for environmental engineers can be expected indefinitely.

NYS DOL Employment Projections for the titles strongly related to Environmental Engineers

SOC Code[1]	Title	Employment		Change		Annual Average Openings			US Growth Rate[8]
		2014	2024	Net	Percent	Total	Growth	Replacement	
17-2051	Civil Engineers	14,940	17,520	2,580	17.3%	700	260	440	8.4
17-2081	Environmental Engineers	3,430	4,140	710	20.7%	170	70	100	12.4
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	1,560	1,860	300	19.2%	80	30	50	6.2
17-2112	Industrial Engineers	8,600	9,450	850	9.9%	340	90	250	0.9

[1]Occupational codes are based on the SOC 2010 coding structure. Detailed information regarding the structure can be found at - http://www.bls.gov/soc/

Similar programs in the capital regions include: (1) BS in Environmental Engineering at Rensselaer Polytechnic Institute (RPI). This degree program focuses on the traditional environmental fields, such as pollutant fate and transport, water treatment, site remediation and bioremediation. Its' curriculum does not include courses tied specifically to sustainability; (2) a minor at Union College (Union). This program does have an emphasis on sustainable development as evidenced by courses such as Renewable Energy Systems, Sustainable Infrastructure, and Environmentally Friendly Buildings. But Union does not have enough course offerings to upgrade this program to a major.

Besides issues with curriculum, both RPI and Union are private institutions charging over $40K tuition per year. This high cost is not affordable for every high school graduate who deserves quality engineering education with a reasonable price tag. Due to this insurmountable expense barrier, many students choose to leave either the capital region or the state of NY and a great number of them never return to this state. As a result, there is a shortage of talent and expertise in this Environmental Engineering field. This program will provide affordable engineering education in the Capital District, increase the number of trained engineers who can serve the local industries and are equipped to tackle challenges we face here and in NY state.

h)(2) ***Employment:*** For programs designed to prepare graduates for immediate employment, use the table below to list potential employers of graduates that have requested establishment of the program and state their specific number of positions needed. If letters from employers support the program, they may be **appended** at the end of this form.

Employer	*Need: Projected positions*	
	In initial year	In fifth year

h)(3) ***Similar Programs:*** Use the table below to list similar programs at other institutions, public and independent, in the service area, region and state, as appropriate. Expand the table as needed. ***NOTE:*** *Detailed program-level information for SUNY institutions is available in the Academic Program Enterprise System (APES) or Academic Program Dashboards. Institutional research and information security officers at your campus should be able to help provide access to these password-protected sites. For non-SUNY programs, program titles and degree information – but no enrollment data – is available from SED's Inventory of Registered Programs.*

Institution	Program Title	Degree	Enrollment
Clarkson University	Environmental Engineering	B.S.	n/a
Columbia University	Earth and Environmental Engineering	B.S	31
Cornell University	Environmental Engineering	B.S	73
CUNY New York City College of Technology	Earth System Science and Environmental Engineering	B.E.	98
Rensselaer Polytechnic Institute	Environmental Engineering	B.S.	65
SUNY College of Environmental Science and Forestry	Environmental Resources Engineering	B.S.	151
University at Buffalo	Environmental Engineering	B.S.	149
United States Military	Environmental Engineering	B.S.	-

h)(4) **C*ollaboration:*** Did this program's design benefit from consultation with other SUNY campuses? If so, what was that consultation and its result?

Yes. The three university centers, University at Buffalo, Binghamton University, and Stony Brook University have all supported UAlbany's proposal to offer a Bachelor of Science degree in Environmental and Sustainable Engineering. As detailed below in h (5), after the College of Environmental Science and Forestry (ESF) opposed UAlbany's first proposal, the provosts and deans of engineering at the three University Centers responded to ESF's April 10, 2017 letter with one of their own in support of our position.

h)(5) ***Concerns or Objections:*** If concerns and/or objections were raised by other SUNY campuses, how were they

resolved?

The College of Environmental Science and Forestry (ESF) objected twice to UAlbany's proposal to offer a new Bachelor of Science degree in Environmental and Sustainable Engineering. The first letter of objection was dated April 10, 2017 after the one-month comment period. Together with the other three University Centers within SUNY, UAlbany responded to ESF's opposition and addressed all of ESF's concerns. Following a second comment period in October, 2017, ESF submitted another letter of objection repeating all of their original concerns. UAlbany again explained the importance of our proposal to SUNY and the people of New York State and provided additional supporting data and other information. Before this response was sent out, the Provosts of UAlbany and ESF met and agreed that collaboration between the proposed program here and the Environmental Resources Engineering at ESF is the only way for resolving our differences. Accordingly, the Dean of the CEAS at UAlbany drafted the framework for collaboration in terms of sharing on-line courses, applied learning for students and research collaboration among faculty. The framework was sent to ESF and we have received their feedback. Before both parties sign the Memorandum of Understanding (MOU), SUNY issued the approval to develop UAlbany's proposal. As of now, both UAlbany and ESF have reached agreement on the framework and we expect a MOU signing ceremony to be held in the very near future.

h)(6) ***Undergraduate Transfer:*** The State University views as one of its highest priorities the facilitation of transfer for undergraduate students. To demonstrate adequate planning for transfer under SUNY's student mobility policy, **Section 9** of this form on **SUNY Undergraduate Transfer** must be completed for programs leading to Associate in Arts (A.A.) and Associate in Science (A.S.) and for baccalaureate programs anticipating transfer enrollment.

2.4. Admissions

a) What are all admission requirements for students in this program? Please note those that differ from the institution's minimum admissions requirements and explain why they differ.

All students eligible for admission to the University at Albany may opt to major in Environmental and Sustainable Engineering.

Environmental and Sustainable Engineering is not a restricted major. At the University at Albany, students may declare a major after completion of 24 credits.

b) What is the process for evaluating exceptions to those requirements?

N/A

b) How will the institution encourage enrollment in this program by persons from groups historically underrepresented in the institution, discipline or occupation?

For Environmental Engineering, women are not underrepresented. In 2014-2015, 49.7% of BS degrees were awarded to female students. This percentage is much higher than the 19.9% for all engineering disciplines (https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf). Although representation from women in general is not a concern for this program, enrollment of students of color is. This can be evidenced from the number of faculty of color in Environmental Engineering. For example, the percentage of African-American Tenured/Tenure-Track Faculty in Environmental Engineering is 1.2%, lower than the average of 2.5% for all disciplines. For Hispanics, the percentage is 3.1%, lower than the average of 3.9%. For Asian Americans, the percentage is 10.4%, much lower than 26.9% in average.

University at Albany is a minority serving institution with approximately 40% of students belonging to historically underrepresented racial/ethnic groups and we expect that the Environmental and Sustainable Engineering major will represent a similar breakdown. To increase enrollment of students from historically underrepresented groups, we are taking a three-front approach: (1) K-12 school outreach to stimulate students' interest and build their confidence toward

STEM, (2) sending our students to professional conferences, such as the annual conference of Society of Women Engineers, the biennial Research and Education Conference organized by the Association of Environmental Engineering and Science Professors (AEESP) to improve the retention of women and minorities in engineering, and (3) faculty role models through aggressive recruitment of a diverse faculty. The College of Environmental and Applied Sciences has been very successful to date in recruiting faculty from a diverse background, particularly with respect to gender, and is actively working to develop resources through philanthropy for targeted endowments and to support our K-12 school outreach and undergraduate retention initiatives. In addition, we will work with the Science & Technology Entry Program at UAlbany to provide research experience within Environmental and Sustainable Engineering to 7th and 10th graders in summer. For students who are on campus already, we will collaborate with the Collegiate Science and Technology Entry Program (CSTEP) to retain them by providing academic enrichment activities.

2.5. Academic and Other Support Services

Summarize the academic advising and support services available to help students succeed in the program.

To ensure student success, bridge programs will be offered during the summer prior to the first cohort once the program is approved. These bridge programs will prepare students in mathematics and science to transition to university level academic expectations. In addition, orientation for engineering science students will start the process of creating a community of like-minded students who can work together from the very first day to ensure each other's success.

In keeping with our belief that engaged students are successful students, engineering science students will be part of a professional community that connects through a living-learning community, association with industry representatives, common co-curricular activities, and connections to professional engineering organizations. Through the efforts of the Student Success division, the Educational Opportunity Program, and the CSTEP, students will have the opportunity to participate in group activities, community engagement experiences, and student clubs and organizations focused on the role of engineering in society. Career Services will create career fairs where students can interact with industry representatives to learn about employment options and arrange optional internship and co-op opportunities. A student chapter of the American Academy of Environmental Engineers and Scientists and the Engineers without Borders will be formed under the leadership of faculty advisors. This will provide UAlbany students access to regional and national professional opportunities and connect them to engineering students around the globe meeting the University motto of "The World Within Reach."

The Advisement Services Center at the University at Albany provides mandatory academic advising for all students until they have completed their first year and/or are admitted into their academic major of choice – whichever comes later. Each student is assigned an individual academic advisor and is encouraged to meet regularly with that advisor. The advisor will provide assistance in making a successful transition to college-level studies.

Once a student decides to major in the Environmental and Sustainable Engineering program, and has completed at least a year of study, that student will be advised by the Environmental and Sustainable Engineering academic advisor. This advisor will be a Staff Associate hired to support the program. The Staff Associate in conjunction with the department faculty will perform all the traditional functions of advisement: general mentoring, orientation to the major, substantive and procedural advisement in the major, supervision of many internships and orientation to the career world.

Advising PLUS is a university-wide service that offers "the help you need, when you need it." Students in academic difficulty receive personal consultation in which the source of the difficulty is identified, and a strategy for addressing it is created. Advising PLUS sponsors review sessions, individual tutoring, facilitates referrals and follow up to services such as departmental tutoring, university counseling, and the full range of student appeals and services available on campus.

In addition to all of these support and advising activities, the CEAS has launched the "Study Cluster" to provide tutoring for all CEAS undergraduates, but particularly those in the first two years. And we have an Engineering and Applied Sciences Living Learning Community in the residence halls that is in its second year and is very successful.

2.6. Prior Learning Assessment

If this program will grant credit based on Prior Learning Assessment, describe the methods of evaluating the learning and the maximum number of credits allowed, **or check here [×] if not applicable**.

2.7. Program Assessment and Improvement

Describe how this program's achievement of its objectives will be assessed, in accordance with *SUNY policy*, including the date of the program's initial assessment and the length (in years) of the assessment cycle. Explain plans for assessing achievement of students learning outcomes during the program and success after completion of the program. **Append** at the end of this form, **a plan or curriculum map** showing the courses in which the program's educational and, if appropriate, career objectives – from Item 2.3(b) of this form – will be taught and assessed. ***NOTE:*** *The University Faculty Senate's Guide for the Evaluation of Undergraduate Programs is a helpful reference.*

This program's achievement of its objectives will be assessed according to Accreditation Board For Engineering And Technology (ABET) standards. Applying for ABET accreditation will follow the first graduating class. To prepare for ABET accreditation, students' works including homework, quizzes, midterm and final exams will be collected in addition to course materials provided by the faculty. Once accredited by ABET, this program will participate in an accreditation review every 6 years by ABET.

Improvement of this program will be performed on an ongoing basis. This improvement is based upon assessment and evaluation of at least five factors.

- First, student quality will be assessed through number of undergraduates in the program, retention and graduation rates for rising juniors, four-year summary of course grades, time of graduation, awards and honors received by students, passing rate of the fundamental engineering exam, end-of-semester surveys and senior exit surveys, student internship experiences and alumni surveys.
- Second, faculty quality will be evaluated based on individual faculty's end of semester teaching evaluation, record of peer-reviewed publications, conference presentations, proposal writings and grants, and awards and honors received by faculty.
- Third, research expenditure will be computed on a yearly basis to position our program well at the national level.
- Fourth, resources, such as facilities, instrumentation, and library holdings will be assessed every year to promote success of this program.
- Fifth, the overall curriculum will be assessed periodically in order to maximize student learning. Bet practices recommended by ABET will be followed to continuously improve the curriculum. For example, for each course, the performance indicators will be revisited, evaluated and revised if necessary to ensure that student outcomes will be accomplished. Rubrics used for evaluating performance indicators will be adjusted to evaluate students' performance in the best possible way. Student outcomes will be analyzed based on performances of the current students and alumni. Then based upon our students' achievement, the ABET recommended student outcomes may be revised. Simultaneously, the Program Educational Objectives will be evaluated periodically by considering inputs from constituents, such as employers, alumni, students and anyone who has vested interest in this program.

On an annual basis, all of these assessments and evaluations will be discussed with departmental faculty at a retreat generally held before the fall semester starts. Approaches to improving the program's objectives will be carried out immediately.

Please see **Appendix 2** for curriculum map detailing educational objectives in specific coursework.

Section 3. Program Schedule and Curriculum

Complete the **SUNY Undergraduate Program Schedule** to show how a typical student may progress through the program. This is the registered curriculum, so please be precise. Enter required courses where applicable, and enter generic course types for electives or options. Either complete the blank Schedule that appears in this section, or complete an Excel equivalent that computes all sums for you, and can be found here. Rows for terms that are not required can be deleted.

NOTES: *The **Undergraduate Schedule** must show **all curricular requirements** and demonstrate that the program conforms to SUNY's and SED's policies.*

- *It must show how a student can complete all program requirements within SUNY credit limits, unless a longer period is selected as a format in Item 2.1(c): two years of full-time study (or the equivalent) and 64 credits for an associate degree, or four years of full-time study (or the equivalent) and 126 credits for a bachelor's degree. Bachelor's degree programs should have at least 45 credits of upper division study, with 24 in the major.*
- *It must show how students in A.A., A.S. and bachelor's programs can complete, within the first two years of full-time study (or 60 credits), no fewer than 30 credits in approved SUNY GER courses in the categories of Basic Communication and Mathematics, and in at least 5 of the following 8 categories: Natural Science, Social Science, American History, Western Civilization, Other World Civilizations, Humanities, the Arts and Foreign Languages*
- *It must show how students can complete Liberal Arts and Sciences (LAS) credits appropriate for the degree.*
- *When a SUNY Transfer Path applies to the program, it must show how students can complete the number of SUNY Transfer Path courses shown in the Transfer Path Requirement Summary within the first two years of full-time study (or 60 credits), consistent with SUNY's Student Seamless Transfer policy and MTP 2013-03.*
- *Requests for a program-level waiver of SUNY credit limits, SUNY GER and/or a SUNY Transfer Path require the campus to submit a Waiver Request –with compelling justification(s).*

EXAMPLE FOR ONE TERM: Undergraduate Program Schedule

Term 2: Fall 20xx	Credits per classification						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Prerequisite(s)**
ACC 101 Principles of Accounting	4			4	4		
MAT 111 College Mathematics	3	M	3	3			MAT 110
CMP 101 Introduction to Computers	3						
HUM 110 Speech	3	BC	3			X	
ENG 113 English 102	3	BC	3				
Term credit total:	16	6	9	7	4		

Special Cases for the Program Schedules:

- *For a program with multiple tracks or with multiple schedule options (such as full-time and part-time options), use one Program Schedule for each track or schedule option. Note that licensure qualifying and non-licensure qualifying options cannot be tracks; they must be separate programs.*
- *When this form is used for a multi-award and/or multi-institution program that is not based entirely on existing programs, use the schedule to show how a sample student can complete the proposed program. **NOTE:** Form 3A, Changes to an Existing Program, should be used for new multi-award and/or multi-institution programs that are based entirely on existing programs.*
- *SUNY policy governs the awarding of two degrees at the same level.*
- *Minors require neither SUNY approval nor SED registration.*

a) If the program will be offered through a nontraditional schedule (i.e., not on a semester calendar), what is the schedule and how does it impact financial aid eligibility? ***NOTE:*** *Consult with your campus financial aid administrator for information about nontraditional schedules and financial aid eligibility.*

N/A

b) For **each existing course** that is part of the proposed undergraduate major (including cognates and restricted electives, but not including general education), **append a catalog description** at the end of this document**.**

Please see **Appendix 3** for Existing Course Descriptions.

c) For **each new course** in the undergraduate program, **append a syllabus** at the end of this document. **NOTE:** Syllabi for all courses should be available upon request. Each syllabus should show that all work for credit is college level and of the appropriate rigor. Syllabi generally include a course description, prerequisites and corequisites, the number of lecture and/or other contact hours per week, credits allocated (consistent with *SUNY policy on credit/contact hours*), general course requirements, and expected student learning outcomes.

Please see **Appendix 4** for New Course Syllabi.

d) If the program requires external instruction, such as clinical or field experience, agency placement, an internship, fieldwork, or cooperative education, **append** a completed External Instruction form at the end of this document.

N/A

SUNY Undergraduate Program Schedule (***OPTION: You can paste an Excel version of this schedule AFTER this line, and delete the rest of this page.)***

Program/Track Title and Award: Environmental and Sustainable Engineering BS

- Indicate **academic calendar type**: [x] Semester [ ] Quarter [ ] Trimester [ ] Other (describe):
- **Label each term in sequence**, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2)
- **Name of SUNY Transfer Path, if one exists: Environmental Engineering See Transfer Path Requirement Summary for details**
- Use the table to show **how a typical student may progress through the program**; copy/expand the table as needed. **Complete all columns that apply to a course.**

Fall 1:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
AMAT 112 Calculus I - R	4	M	4	4	4		
ACHM 120 Gen Chemistry I - R	3	NS	3	3	3		
ACHM 124 Gen Chemistry I Lab-R	1		1	1	1		
IESE/ICEN 110 Intro to Engineering - R	2		2	2	2	x	C: AMAT 112 or 118
US History/Social Science General Ed - RE	3	AH/SS	3				
ABIO 130 General Biology: Molecular and Cell Biology and Genetics - R	3	NS	3	3	3		
Term credit totals:	16	13	16	13	13		

Spring 1:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
AMAT 113 Calculus II - R	4	M	4	4	4		
Basic Communication Gen Ed - R	3	BC	3				
ICEN/ICSI 201 Intro to Computer Science - R	4			4	4		P: IESE/ICEN 100
ACHM 121 General Chemistry II - R	3	NS	3	3	3		P: ACHM 120 or 130
ACHM 125 General Chemistry II Lab - R	1		1	1	1		P: ACHM 124. C:ACHM 121 or 131
ABIO 131 General Biology: Ecology, Evolution, and Physiology - R	3	NS	3	3			
Term credit totals:	18	13	14	15	12		

Fall 2:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
ABIO 201 Intro to Biological Investigations I - R	1		1	1	1		P:ABIO130, 131
APHY 140 or 142 Physics 1: Mechanics - R	3	NS	3	3	3		P:AMAT 111 OR 112 OR 118
APHY 145 Physics 1 Lab - R	1		1	1	1		P or C: APHY 140 or 142
AMAT 214 Calculus of Several Variables - R	4	M	4	4	4		

Spring 2:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
ABIO 202 Intro to Biological Investigations II - R	1		1	1			P: ABIO 130, 131
APHY 150 or 152 Physics II - Electromagnetism - R	3	NS	3	3	3		P: APHY 140 or 142
APHY 155 Physics II Lab	1		1	1	1		C: APHY 150 or 152
AMAT 311 Ordinary Differential Equations - R	3		3	3	3		P: AMAT 214

16

IESE2XX - Statics - R	3			3	3	X	P:AMAT 113
ICEN/CSI 210 Discrete Structures - R	4			4			P: AMAT 112
Term credit totals:	16	7	9	16	12		

AATM 210/210Z Atmospheric Structure, Thermodynamics and Circulation - R	3		3	3			P: AMAT 111, 112 or 118; APHY 140 or 142
IESE 2XX Strength of Materials - R	3			3	3		P: IESE 2XX Statics
Arts/International Perspectives Gen Ed - RE	3	AR/OW	3				
Term credit totals:	17	6	14	14	10		

Fall 3:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
IESE 3XX - Introduction to Environmental and Sustainable Engineering - R	3			3		x	P: A BIO 131, ACHM 121, AMAT 311
ESPH 321 Global Environmental Issues and Their Effect on Human Health - R	3		3	3			P:One year college level Bio
AMAT 370 Probability and Stats for Eng - R	3		3	3			P: AMAT 367 OR ICEN/ICSI 210
IESE 3XX - Fluid Mechanics - R	3			3		x	P: AMAT 214, ESE 201, APHY 140 or 142
IESE Elective 1 of 3* – RE	3			3			
Term credit totals:	15		6	15			

Spring 3:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
Foreign Language Gen Ed - RE	4	FL	4				
IESE 4XX Energy Engineering- R	3			3		x	Junior or Senior Standing
IESE Elective 2 of 3* - RE	3			3			
AENV 250 Sustainable Development: Energy and Resources - R	3		3	3			P: ACHM 120 or 130, AMAT 111 or 112 APHY 140 or 142
Local Gen Ed - RE	3	CH	3				
Term credit totals:	16	7	10	9			

Fall 4:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
IESE 4XX Air Quality Modeling	3			3		x	P:AATM 210/210Z
IESE 4XX Hazardous Waste Management - R	3			3		x	ESE 3XX: Intro ESE, ESE 3XX Fluid Mech

Spring 4:	See KEY.						
Course Number & Title	**Cr**	**GER**	**LAS**	**Maj**	**TPath**	**New**	**Co/Prerequisites**
IEHS 560 Sustainability, Green Design -R	3			3			
IESE 4XX Capstone Sr Design - R	3			3		x	Senior standing

IESE 4XX Water and Wastewater Treatment - R	3			3		x	P:ESE 3XX Intro to ESE, ESE 3XX Fluid Mechanics	Humanities Gen Ed - RE	3	3	3				
IESE 4XX Water Resource Engineering- R	3			3		x	P:ESE 3XX Fluid Mechanics	IESE 4XX Air Pollution Control - R	3			3		x	P:AATM 210/210Z
IESE Elective 3 of 3* - R	3			3				IESE 4XX Advanced Wastewater Engineering-R	3			3		x	P:ESE 4XX Water and Wastewater Treatment
Term credit totals:	15			15				Term credit totals:	15	3	3	12			

Program Totals (in credits):	Total 128 Credits:	SUNY GE49	LAS:72	Major:109	Elective & Other: 0	Upper Division: 48	Upper Division Major: 48	Number of SUNY GER Categories: 9

KEY Cr: credits **GER:** SUNY General Education Requirement (Enter Category Abbreviation) **LAS:** Liberal Arts & Sciences (Enter credits) **Maj:** Major requirement (Enter credits) **TPath:** SUNY Transfer Path Courses (Enter credits) **New:** new course (Enter X) **Co/Prerequisite(s):** list co/prerequisite(s) for the noted courses **Upper Division:** Courses intended primarily for juniors and seniors **SUNY GER Category**

Abbreviations: American History (AH), Basic Communication (BC), Foreign Language (FL), Humanities (H), Math (M), Natural Sciences (NS), Other World Civilizations (OW), Social Science (SS), The Arts (AR), Western Civilization (WC)

*ESE Electives – Choose three courses from: AATM 200 Natural Disasters, AATM 301 Surface Hydrology and Hydrometeorology, AATM 304 Air Quality and Air Pollution Policy, AENV/AATM 315 Environmental Statistics and Computation, AGOG 496/AUSP 456 Geographic Information Systems, AUSP 452 CADD in Planning, HSPS/HEHS 323 Environmental Laboratory Perspectives in Public Health, HEHS 520 Principles of Environmental Chemistry, IESE 4XX Groundwater Hydrology

18

Section 4. Faculty

a) Complete the **SUNY Faculty Table** on the next page to describe current faculty and to-be-hired (TBH) faculty.

b) **Append** at the end of this document position descriptions or announcements for each to-be-hired faculty member.

Please see **Appendix 5** for vacancy announcements and position descriptions.

c) What is the institution's definition of "full-time" faculty?

A full time faculty member is one who holds an appointment with a 100% time commitment.

19

SUNY Faculty Table

Provide information on current and prospective faculty members (identifying those at off-campus locations) who will be expected to teach any course in the major. Expand the table as needed. Use a separate Faculty Table for each institution if the program is a multi-institution program.

(a)	(b)	(c)	(d)	(e)	(f)
Faculty Member Name and Title/Rank (Include and identify Program Director with an asterisk.)	**% of Time Dedicated to This Program**	**Program Courses Which May Be Taught (Number and Title)**	**Highest and Other Applicable Earned Degrees (include College and University)**	**Discipline(s) of Highest and Other Applicable Earned Degrees**	**Additional Qualifications: List related certifications, licenses and professional experience in field.**
PART 1. Full-Time Faculty					
*Yanna Liang, *Professor and Chair*	100%	ESE 3XX: Intro. to Env. Eng.; ESE 4XX: Water and Wastewater Treat.; ESE 4XX: Advanced Wastewater Eng. ESE 4XX: Energy Engineering	Ph.D. Utah State University	Environmental Engineering	P.E., BCEE; > 25 years in Environmental Engineering
Kim L. Boyer, Professor and Dean	5%	ESE/CEN 110 Intro to Engineering	Ph.D. Purdue	Electrical Engineering	Fellow IEEE, Fellow IAPR, Jefferson Science Fellow
Kyoung-Yeol Kim, Assistant Professor	100%	ESE 2XX: Statics; ESE 3XX: Intro. to Env. Eng.; ESE 4XX: Water and Wastewater Treat.; ESE 4XX: Advanced Wastewater Eng.; ESE 4XX: Energy Engineering	Ph.D. Gwangju Institute of Science and Technology (GIST), South Korea	Environmental Engineering	BS and MS, Environmental Engineering; Over four years of postdoctoral experience in this field.
MD. Aynul Bari, Assistant Professor	100%	ESE 2XX: Statics; ESE 4XX: Air pollution control; ESE 4XX: Air Quality Modeling	Ph.D. University of Stuttgart, Germany	Environmental Engineering	MS Environmental Engineering; Over nine years postdoctoral experience in this field.

Rixiang Huang, Assistant Professor	100%	ESE 3XX: Intro. to Env. Eng.; ESE 4XX: Water and Wastewater Treat.; ESE 4XX: Advanced Wastewater Eng.; ESE 4XX: Hazardous waste management; ESE 4XX: Energy Engineering	Ph.D. Baylor University	Geology	MS Environmental Sciences; Over five years postdoctoral experience in this field.
Erfan Goharian	100%	ESE 3XX: Fluid Mechanics; ESE 4XX: Water Resource Engineering; ESE 4XX: Groundwater hydrology	Ph.D. University of Utah	Environmental Engineering, Water Resources Management	MS Water Resources Management; Over three years postdoctoral experience in this field.
Gary Saulnier, Professor	12.5%	ESE/CEN 110 Intro to Engineering	PhD, Rensselaer Polytechnic Institute	Electrical Engineering	Ohio State, RPI, Bell Labs
Andrea Lang, *Assistant Professor*	12.5%	ATM 210/210Z Atmospheric Structure, Thermodynamics and Cirulation	Ph.D. University of Wisconsin	Atmospheric and Oceanic Science	MS Atmospheric and Oceanic Science
Robert Keesee, *Associate Professor*	12.5%	ENV 250 Sustainable Development: Energy and Resources	Ph.D. University of Colorado, Boulder	Physical Chemistry	
Dr Erin Bell, *Associate Professor*	12.5%	SPH 321 Global Environmental Issues and Their Effect on Human Health	PhD - UNC	Epidemiology	MS - Epidemiology
Dr. Haider Khwaja, *Associate Professor*	12.5%	SPH/EHS 323 Environmental Laboratory Perspectives in Public Health	PhD - University of New Brunswick	Physical Chemistry	Physical Chemistry
Team Taught Course Director: Dr. Kurunthachalam Kannan, *Professor* Secondary: Buu Tran, Patrick Parsons, Haider Khwaja, and Lei Zhu		EHS 520 Principles of Environmental Chemistry	PhD - Ehime University	Environmental Chemistry and Ecotoxicology	MS - Environmental Chemistry and Ecotoxicolog
Dr. Xiaobo Xue, *Assistant Professor*	12.5%	EHS 560 Sustainability, Green Design and Public Health	PhD - University of Pittsburgh	Environmental Engineering	MS - Beijing Jiaotong Univeristy
Part 2. Part-Time Faculty					
TBH1 Adjunct Lecturer		IESE 2XX Strength of Materials			

Section 5. Financial Resources and Instructional Facilities

a) What is the resource plan for ensuring the success of the proposed program over time? Summarize the instructional facilities and equipment committed to ensure the success of the program. Please explain new and/or reallocated resources over the first five years for operations, including faculty and other personnel, the library, equipment, laboratories, and supplies. Also include resources for capital projects and other expenses.

The ESE department has hired four faculty in addition to the chair. Once the program is launched, increases in enrollment will support the cost of the program including adding more faculty. In terms of instructional facilities and equipment, our courses will be taught in existing classrooms. According to the University at Albany space planning group, the campus has adequate classroom capacity to offer an additional 16 courses per year. The majority of these courses do not require any specialized equipment, except those with wet lab sessions.
For these labs, the Office of Facilities Management has been trying to identify lab space.

Most faculty in the ESE program will need wet lab space for research except a few who do modeling work. The Office of Facilities Management is renovating Biology (BI) 317 and 318 for Dr. Yanna Liang, chair of the ESE department. These two labs will be ready in the mid of February 2018. Wet lab space for potential new hires has been located in the same building. The open and shared lab (BI 355) with approximately 3,000 ft^2 is anticipated to be ready by summer of 2018. We expect that all research and teaching labs for the ESE program will be on the same floor of the Biology building. In addition, a place for a core facility of CEAS has been identified in the basement (BI 24 and 25) of the Biology building. This core facility will house major equipment and instrumentation bought by ESE faculty and will be shared among the faculty in the ESE department and others in the College.

Expensive equipment critical to research interests of ESE faculty members will be will be purchased through their start-up packages. These packages will be different among the new hires and will serve the purpose to jump start the new faculty's research.

b) Complete the five-year SUNY Program Expenses Table, below, consistent with the resource plan summary. Enter the anticipated academic years in the top row of this table. List all resources that will be engaged specifically as a result of the proposed program (e.g., a new faculty position or additional library resources). If they represent a continuing cost, new resources for a given year should be included in the subsequent year(s), with adjustments for inflation or negotiated compensation. Include explanatory notes as needed.

22

SUNY Program Expenses Table

PROGRAM EXPENSES CATEGORIES	Expenses (in dollars)					
	Before Start	Academic Year 1	Academic Year 2	Academic Year 3	Academic Year 4	Academic Year 5
(a) Personnel (including faculty and all others	$ -	$ 201,000	$ 655,020	$ 1,018,120	$ 1,038,483	$ 1,059,252
(b) Library			$ 80,180	$ 77,974	$ 82,325	$ 86,924
(c) Equipment/Furniture	$ 40,000	$ 7,000	$ 4,000	$ -	$ -	$ -
(d) Laboratory Supplies and Equipment	$ 50,000		$ -	$ 100,000	$ -	$ -
(e) Supplies, Search Expenses and Department Set-up	$ 85,000	$ -	$ -	$ -	$ -	$ -
(f) Capital Expenses	$ 64,187	$ 650,430	$ 951,625	$ 387,844	$ 210,000	$ 87,500
(g) Student Stipends or scholarships						
(h) Other (specify): College of Arts and Sciences Costs	$ -	$ -	$ 104,000	$ 179,500	$ 179,500	$ 317,200
Sum of Rows Above	$ 239,187	$ 858,430	$ 1,794,825	$ 1,763,439	$ 1,510,308	$ 1,550,877

Section 6. Library Resources

a) Summarize the analysis of library collection resources and needs *for this program* by the collection librarian and program faculty. Include an assessment of existing library resources and accessibility to those resources for students enrolled in the program in all formats, including the institution's implementation of SUNY Connect, the SUNY-wide electronic library program.

The University Libraries are among the top 115 research libraries in the country and support a number of degree programs in the sciences, as well as those of Geography and Planning, Public Health, and Public Policy and Management. The University Library, the Science Library, and the Dewey Graduate Library contain more than two million volumes and over 2.9 million microforms. The Libraries provide access to more than 97,000 online journals and over 340,000 online books. Whenever possible, current subscriptions are available online. Additionally, the Libraries serve as a selective depository for U.S. Government publications and house collections of software and media.

The Science Library serves the entire University at Albany community, but contains collections supporting the departments of Atmospheric and Environmental Sciences, Biological Sciences, Chemistry, Computer Science, Mathematics and Statistics, Physics, and Psychology, as well as the School of Public Health. Approximately 600,000 volumes in the science and technology subject areas (Q-TP of the Library of Congress classification

23

scheme) are housed in this library. Online resources (journals, databases, e-books, digital libraries) are available on and off campus, all hours of the day to members of the University at Albany community.

Databases and Digital Collections
The University Libraries currently subscribe to a number of important databases and digital collections for Environmental and Sustainable Engineering. *Web of Science* is an important cross-disciplinary database which is very strong in the sciences. *EBSCO Academic Search Complete* is another cross-disciplinary database which is good for locating articles on environmental issues. *Google Scholar* is another cross-disciplinary database which should be useful in locating journal articles on this topic.

Databases addressing aspects of Environmental and Sustainable Engineering are:
-*Applied Science and Technology Source*
-*BIOSIS Citation Index*
-*Chemical Abstracts on SciFinder*
-*Energy & Power Source*
-*Environment Complete*
-*GeoRef*
-*GreenFILE*
-*INSPEC*
-*Meteorological & Geoastrophysical Abstracts (MGA)*
-*MEDLINE*

Important digital journal collections provided by the University Libraries include *ScienceDirect* and the *American Chemical Society Online Journals* (1879+). *GeoScienceWorld* offers a number of journals in environmental geoscience. The *SPIE Digital Library* offers a large number of important remote sensing proceedings.

At this time, no new databases are recommended.

Journals
The University Libraries subscribe to a large number of journals (more than 97,000 titles), and almost all current content is available online. To assess the journals collection for this new B.S. program, the University Libraries collection was compared to a list of "important scholarly journals" developed in consultation with the Chair of the Department of Environmental & Sustainable Engineering. This study found that the University Libraries provide online access (through subscription or *ScienceDirect*) to 15 of 32 (47%) Journals listed.

These titles are:
-*Applied Biochemistry and Biotechnology*
-*Biochemical Engineering Journal*
-*Bioresource Technology*
-*Building and Environment*
-*Coastal Engineering*
-*Ecological Engineering*
-*Environmental Modelling and Software*
-*Environmental Science & Technology*
-*Journal of Environmental Management*
-*Journal of Environmental Quality*
-*Journal of Hazardous Materials*
-*Journal of Environmental Sciences*
-*Ocean Engineering*
-*Process Safety and Environmental Protection: Transactions of Chemical Engineers, Part B*

24

-*Science of the Total Environment*

A further 10 of 32 (31%) journals offer partial access (the current year is embargoed, although earlier volumes are available). These journal titles are: *AIChE Journal, Biodegradation, Environmental Engineering Science, Environmental Progress and Sustainable Energy, Indoor Air, International Journal of Environmental Science and Technology, Journal of Polymers and the Environment, Reviews in Environmental Science and Biotechnology, Stochastic Environmental Research and Risk Assessment,* and *Water, Air and Soil Pollution*. To provide access to these journal titles would cost **$28,412.00**.

Only 7 of the 32 (22%) journals are not available at all through the University Libraries. To provide access would cost **$29,696.00**. They are:

-*Agronomy for Sustainable Development* $901.00
-*Critical Reviews in Environmental Science and Technology* $7,203.00
-*Environmental Geochemistry and Health* $2,153.00
-*Journal of Environmental* Engineering, *ASCE* $1,390.00
-*Journal of Environmental Science and Health – Part Toxic/Hazardous Substances and Environmental Engineering* $5,341.00
-*Waste Management and Research* $1,508.00
-*Water Science and Technology* $11,200.00

Books

Books serve as an important foundational resource for undergraduates. For the Environmental and Sustainable Engineering program, there will be some overlap between books purchased to support programs in Atmospheric and Environmental Sciences, Biology, Public Health, General Science and Public Policy, as well as a proposed B.S. in Interdisciplinary Studies with a concentration in Environmental Sciences.

We are recommending an annual budget of **$15,000.00**, to purchase 100 books at an average cost of $150.00 each, to support this program. In addition, a core collection of important books will need to be acquired. To create a basic undergraduate book collection for the Environmental and Sustainable Engineering program, *RCL: Resources for College Libraries* (RCLweb.net) was consulted. It provides a list of core titles that are essential for undergraduate study in different subjects. The environmental engineering section contains 28 books - the University Libraries already have 10 of the books on the list. It is recommended that the remaining 18 books should be acquired at a cost of **$4,849.89**.

Reference Collection

The reference collection of the University Libraries currently houses resources that would support an Environmental and Sustainable Engineering program. Some of the resources are available in the Science Library or University Library, and some are available online.

There are a number of reference books related to aspects of environmental science, including these titles:

Atlas of Climate Change, University of California Press, 2011.
Climate Change: an Encyclopedia of Science and History, ABC-CLIO, 2013.
Dictionary of Ecology, Oxford University Press, 2010.
Dictionary of Energy, Elsevier, 2015.
Dictionary of Environment and Conservation, 2nd ed., Oxford University Press, 2013.
Encyclopedia of Atmospheric Sciences, Academic Press, 2015.
Encyclopedia of Climate and Weather, Oxford University Press, 2011.
Encyclopedia of Energy, Salem Press, 2013.
Encyclopedia of Environmental Issues, Salem Press, 2011.
Encyclopedia of Global Warming, Salem Press, 2016.

25

Encyclopedia of Global Warming & Climate Change, SAGE, 2008.
Encyclopedia of Pollution, Facts on File, 2011.
Environmental Encyclopedia, Cengange Learning, 2011.
Facts on File Dictionary of Environmental Science, 3rd ed., Facts on File, 2007.
Green Issues and Debates: an A-to-Z Guide, Sage Publications, 2011.
Keywords for Environmental Studies, New York University Press, 2016.
Oxford Companion to Global Change, Oxford University Press, 2009.
Water Encyclopedia, 2rd ed., Lewis Publishers, 1990.

There are several important reference resources that should be purchased. These include 4 dictionaries (**$428.29**), and 1 encyclopedias **($1,043.00**). The total cost of these resources is **$1,471.29**. In addition, it is recommended that **$750.00** be added to the annual Science Library reference budget to purchase new reference resources for environmental engineering each year.

Standards
Engineers depend on industrial standards for their work. Currently, the University Libraries rely on the New York State Library for standards, which has a large collection along with related publications. The Websites of several organizations provide free standards searching capabilities. No resources are recommended at this time. As the program grows, the University Libraries may need to revisit the acquisition of standards related to Environmental and Sustainable Engineering, if the need exists. A purchase on demand model may be the best way to address these needs.

Government Documents
Government publications are important for environmental research. The University Libraries serve as a selective government document depository for federal publications. Also, a large number of government documents are available online, and can be located using a search tool like Google.

Interlibrary Loan and Delivery Services
The University Libraries' Interlibrary Loan (ILL) Department borrows books and microforms, and obtains digital copies of journal articles and other materials not owned by the Libraries from sources locally, statewide, nationally, and internationally. ILL services are available at no cost to the user for faculty, staff, and students currently enrolled at the University at Albany. Users can manage their requests through the use of ILLiad, the University Libraries' automated interlibrary loan system, which is available through a Web interface at https://illiad.albany.edu/.

The University Libraries also provide delivery services for books and articles housed in any of the three libraries. Books can be delivered to one of the libraries or, for faculty, to departmental addresses. Articles are scanned and delivered electronically via email. The Libraries also provide free delivery services to the home addresses of online learners and people with disabilities. Delivery services are managed through ILLiad as well.

Summary
Many resources purchased for atmospheric science and other science/technology subjects will support an Environmental and Sustainable Engineering program. However, additional resources will be needed. Those are:

Journals for Environmental and Sustainable Engineering (annual) -- $58,108.00
Books and other resources – (one time purchase) -- $4,849.89
Books and other resources – (annual) -- $15,000.00
Reference resources (one time purchase) -- $1,471.29
Reference resources (annual) -- $750.00

26

b) Describe the institution's response to identified collection needs and its plan for library development.

The line item for the library resources within the program budget was based on the report generated by the library and includes funds for the purchase of the journals, books and reference resources identified as needed.

Section 7. External Evaluation

SUNY requires external evaluation of all proposed bachelor's degree programs, and may request an evaluation for a proposed associate degree or certificate program in a new or emerging field or for other reasons.

Is an external evaluation required? [ ] No [X] Yes

If yes, list below all SUNY-approved evaluators who conducted evaluations (adding rows as needed), and **append at the end of this document** each original, signed *External Evaluation Report*. ***NOTE:*** *To select external evaluators, a campus sends 3-5 proposed evaluators' names, titles and CVs to the assigned SUNY Program Reviewer, expresses its preferences and requests approval.*

Evaluator #1	**Evaluator #2**
Name: Dr. Ben J. Stuart, Ph.D. Title: Senior Associate Dean, Professor of Civil and Environmental Engineering Institution: Old Dominion University	Name: Dr. Allison MacKay, Ph.D. Title: Professor and Chair Dept of Civil, Environmental & Geodetic Engineering Institution: The Ohio State University

Section 8. Institutional Response to External Evaluator Reports

As applicable, **append** at the end of this document a single *Institutional Response* to all *External Evaluation Reports.*

Section 9. SUNY Undergraduate Transfer

The State University views as one of its highest priorities the facilitation of transfer.

a) For a **proposed Associate in Arts (A.A.) or an Associate in Science (A.S.) degree,** demonstrate that the program's graduates will be able to transfer into at least two parallel SUNY baccalaureate programs and complete them within two additional years of full-time study, per SUNY policy, by listing the transfer institutions below and **appending** at the end of this document**:**

- two completed *SUNY Transfer Course Equivalency Tables*, one for each transfer institution; and
- a letter from the Chief Academic Officer of each transfer institution asserting acceptance of the completed Transfer Course Equivalency Table.

Program proposals must include two articulation agreements with parallel programs. Every effort should be made to obtain two SUNY articulation agreements for this requirement. In the event that such articulations are not possible, campuses are encouraged to work with their campus reviewer to find appropriate alternatives.

Baccalaureate Degree Institution	Baccalaureate Program SED Code and Title	Degree

b) For a **proposed baccalaureate program,** document articulation with at least two parallel SUNY associate degree programs for seamless transfer, by **appending documentation of articulation**, such as *SUNY Transfer Course Equivalency Tables* and/or letters of support from Chief Academic Officers at associate degree institutions or their designees. **If transfer does not apply to this program, please explain why.**

Associate Degree Institution	Associate Program SED Code and Title	Degree
Hudson Valley Community College	00919 Engineering Science	AS
Dutchess County Community College	00642 Engineering Science	AS

NOTE: *Transfer course equivalency tables are needed, despite SUNY Transfer Paths, to ensure that all courses in an A.A. or A.S. program will be accepted for transfer. Official SED program titles and codes can be found on NYSED's Inventory of Registered Programs here.*

Please see **Appendix 6** for Transfer Course Equivalency Tables

Section 10. Application for Distance Education

a) Does the program's design enable students to complete 50% or more of the course requirements through distance education? [X] No [ ] Yes. If yes, **append** a completed *SUNY Distance Education Format Proposal* at the end of this proposal to apply for the program to be registered for the distance education format.

b) Does the program's design enable students to complete 100% of the course requirements through distance education? [X] No [ ] Yes

Section MPA-1. Need for Master Plan Amendment and/or Degree Authorization

a) Based on guidance on Master Plan Amendments, please indicate if this proposal requires a Master Plan Amendment.
[X] No [ ] Yes, a completed *Master Plan Amendment Form* is **appended** at the end of this proposal.

b) Based on *SUNY Guidance on Degree Authorizations* (below), please indicate if this proposal requires degree authorization.

[X] No [ ] Yes, once the program is approved by the SUNY Provost, the campus will work with its Campus Reviewer to draft a resolution that the SUNY Chancellor will recommend to the SUNY Board of Trustees.

SUNY Guidance on Degree Authorization. *Degree authorization is required when a proposed program will lead to a new degree (e.g., B.F.A., M.P.H.) at an existing level of study (i.e., associate, baccalaureate, first-professional, master's, and doctoral) in an existing disciplinary area at an institution. Disciplinary areas are defined by the New York State Taxonomy of Academic Programs. Degree authorization requires approval by the SUNY Provost, the SUNY Board of Trustees and the Board of Regents.*

List of Appended and/or Accompanying Items

a) Appended Items: If materials required in selected items in Sections 1 through 4 and Sections 9, 10 and MPA-1 of this form apply to this proposal, they should be appended as part of this document, after this page, with continued pagination. In the first column of the chart below, please number the appended items, and append them in number order.

Number	Appended Items	Reference Items
	For multi-institution programs, a letter of approval from partner institution(s)	Section 1, Item (e)
1	*For programs leading to professional licensure*, a side-by-side chart showing how the program's components meet the requirements of specialized accreditation, Commi ss i oner' s Regulations for the Profession, or other applicable external standards	Section 2.3, Item (e)
	For programs leading to licensure in selected professions for which the SED Office of Professions (OP) requires a specialized form, a completed version of that form	Section 2.3, Item (e)
	OPTIONAL: For programs leading directly to employment, letters of support from employers, if available	Section 2, Item 2.3 (h)(2)
2	*For all programs*, a plan or curriculum map showing the courses in which the program's educational and (if appropriate) career objectives will be taught and assessed	Section 2, Item 7
	Sample Program and Curriculum	Section 3
3	*For all programs*, a catalog description for each existing course that is part of the proposed undergraduate major (including cognates and restricted electives)	Section 3, Item (b)
4	*For all programs with new courses in the major*, syllabi for all new courses in a proposed undergraduate major	Section 3, Item (c)
	For programs requiring external instruction, a completed *External Instruction Form* and documentation required on that form	Section 3, Item (d)
5	*For programs that will depend on new faculty*, position descriptions or announcements for faculty to-be-hired	Section 4, Item (b)
6	*For all A.A. and A.S. programs*, Transfer Equivalency Tables and letters of support from at least two SUNY baccalaureate institutions; *for baccalaureate programs that anticipate transfer student enrollment*, documentation of seamless transfer with at least two SUNY two-year programs	Section 9
	For programs designed to enable students to complete at least 50% of the course requirements at a distance, a *Distance Education Format Proposal*	Section 10
	For programs requiring an MPA, a *Master Plan Amendment Form*	Section MPA-1

c) Accompanying Items - External Evaluations and Institutional Response: If Sections 7 and 8 of this form indicate that external evaluation is required as part of this proposal, please send a separate electronic document to *program.review@suny.edu* that contains the original, signed *External Evaluation Reports* and a single *Institutional Response* to all reports. The file name should indicate the campus, program title, award and content of the file (e.g., BuffaloU-English-PhD-ExEval).

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 1

Side by side chart of program components and requirements of specialized accreditation

Appendix 1

For programs leading to professional licensure, a side-by-side chart showing how the program's components meet the requirements of specialized accreditation, Commissioner's Regulations for the profession, or other applicable external standards

Agency	**Standard**		**How the standard is met by the new program**
Commissioner	Education/experience credits may also be proportionally earned for various levels and types of postsecondary education which, while not entirely the study of professional engineering, contain important elements/content of such study. Such postsecondary education should demonstrate the following: 1. that it contains important elements/content of the study of professional engineering, such as mathematics, physics, chemistry, physical and applied sciences, design, and properties of materials;		AMAT 112/113 Calculus I, II; AMAT 214 Calculus of Several Variables; AMAT 311 Ordinary Differential Equations; ACHM 120/124 General Chemistry I plus lab; ACHM 121/125 General Chemistry II plus lab; ABIO 130 General Biology: Molecular and Cell Biology and Genetics; ABIO 131 General Biology: Ecology, Evolution, and Physiology; ABIO 201/202 Intro to Biological Investigations I, II; APHY 140 or 142 Physics 1: Mechanics plus lab; APHY 150 or 152 Physics II - Electromagnetism plus lab; ICEN/IESE 110 Intro to Engineering; ICEN/ICSI 201 Introduction to Computer Science; I CEN 210 Discrete Structures; IESE201 - Statics; IESE 2XX Strength of Materials; IESE 3XX - Fluid Mechanics; ATM 210/210Z Atmospheric Structure, Thermodynamics and Cirulation; ENV 250 Sustainable Development: Energy and Resources; ESE 3XX - Introduction to Envrironmental and Sutainable Engineering; HSPH 321 Global Environmental Issues and Their Effect on Human Health; AMAT 370 Probability and Stats for Eng; IESE 4XX Water Resource Engineering; IESE 4XX Air Pollution Control; IESE 4XX Water and Wastewater Treatment; HEHS 520 Environmental Chemistry; IESE 4XX Solid and Hazardous Waste Engineering; HEHS 560 Sustainability, Green Design and Public Health.

Commissioner	that it is in an appropriate subject relevant to the field of professional engineering, such as mathematics, physics, chemistry, physical and applied sciences, design, and properties of materials;		IESE/ICEN 110 Intro to Engineering; ICEN/ICSI Introduction to Computer Science; I CEN 210 Discrete Structures; IESE2XX - Statics; IESE 2XX Strenth of Materials. ESE 3XX - Fluid Mechanics; ATM 210/210Z Atmospheric Structure, Thermodynamics and Cirulation; ENV 250 Sustainable Development: Energy and Resources; ESE 3XX - Introduction to Environmental and Sutainable Engineering; HSPH 321 Global Environmental Issues and Their Effect on Human Health; AMAT 370 Probability and Stats for Eng; IESE 4XX Water Resource Engineering; IESE 4XX Air quality modeling; IESE 4XX Water and Wastewater Treatment; HEHS 520 Environmental Chemistry; IESE 4XX Solid and Hazardous Waste Engineering; HEHS 560 Sustainability, Green Design and Public Health.
Commissioner	that it is at an appropriate level of study that would, at a minimum, be the material equivalent of study at an undergraduate level		BS in Environmental and Sustainable Engineering
Commissioner	that it is part of a program accredited by an acceptable accrediting agency or part of a program equivalent to such an accredited program.		Designed to meet ABET accreditation standards as shown below
ABET	a minimum of 30 semester credit hours (or equivalent) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program.		A total of 42 credit hours of math and basic sciences: AMAT 112/113 Calculus I, II; AMAT 214 Calculus of Several Variables; AMAT 311 Ordinary Differential Equations; ACHM 120/124 General Chemistry I plus lab; ACHM 121/125 General Chemistry II plus lab; ABIO 130 General Biology: Molecular and Cell Biology and Genetics; ABIO 131 General Biology: Ecology, Evolution, and Physiology; ABIO 201/202 Intro to Biological Investigations I, II; APHY 140 or 142 Physics 1: Mechanics plus lab; APHY 150 or 152 Physics II - Electromagnetism plus lab

Appendix 1

ABET	a minimum of 45 semester credit hours (or equivalent) of engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools.		A total of 46 credits hours of engineering topics including: (1) 38 credit hours from ESE core courses: IESE/CEN 110 Intro to Engineering; IESE 2XX - Statics; IESE 2XX Strenth of Materials; IESE 3XX - Fluid Mechanics; IESE 3XX - Introduction to Environmental and Sutainable Engineering; IESE 4XX Water Resource Engineering; IESE 4XX Air Pollution Control; IESE 4XX Water and Wastewater Treatment; IESE 4XX Solid and Hazardous Waste Engineering; IESE 4xx Energy Engineering; IESE 4XX Advanced wastewater engineering; IESE 4xx Groundwater hydrology; IESE 4xx capstone senior design; and (2) 8 credit hours from computer engineering: ICEN/ICSI Introduction to Computer Science; ICEN 210 Discrete Structures.
ABET	a broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives.		30 credit General Education program, to include coursework in Arts, Humanities, Social Science, US History, International Perspectives, Foreign Language, Basic Communication. (Math and Natural Science are covered by major coursework.)
ABET	a culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work.		IESE 4XX Capstone Senior Design Project

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 2

Curriculum map detailing educational objectives and how they will be assessed

Strategies/Environmental and Sustainable Engineering/Required

ABET Program Outcomes	Performance Criteria	ESE 110 Intro to Engineering	ESE 2XX Statics	ESE 3XX Fluid Mechanics	ESE 2XX Strength of Materials	ESE 3XX Intro to Environ. Eng. with lab	ESE 4XX Water and Wastewater Eng.	ESE 4XX Water Resource Eng.	ESE 4XX Air Pollution Control	ESE 4XX Hazardous Waste Engineering	ESE 4XX Capstone Design
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		x	x	x	x	x	x	x	x	x	x
	1a: Solve textbook problems	x	x	x	x	x	x	x	x	x	x
	1b: Propose a hypothesis for a given problem	x				x	x		x	x	x
	1c: Design an experiment to test the hypothesis	x				x					x
	1d: Analyze experimental data	x				x					x
	1e: Solve the problem through an iterative approach	x				x					x
	1f: Model the problem mathematically and apply standard mathematical and engineering tools	x				x					x
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors		x	x	x	x	x	x	x	x	x	x
	2a: Establish a plan to solve the problem	x	x	x	x	x	x	x	x	x	x
	2b: Research possible alternatives and assess the likelihood of success	x					x	x		x	x
	2c: Conduct a risk benefit analysis	x					x	x		x	x
	2d: Secure necessary resources to execute the plan	x									x
	2d: Revise the plan if needed considering all potential factors	x					x	x		x	x
(3) communicate effectively with a range of audiences		x	x	x	x	x	x	x	x	x	x
	3a: Present solutions to given problems	x	x	x	x	x	x	x	x	x	x
	3b: Write reports and suggest recommendations	x				x				x	x
	3c: Work collaboratively with people from different backgrounds	x				x				x	x
	3d: Participate in group discussions	x				x				x	x

ABET Program Outcomes	Performance Criteria	ESE 110 Intro to Engineering	ESE 2XX Statics	ESE 3XX Fluid Mechanics	ESE 2XX Strength of Materials	ESE 3XX Intro to Environ. Eng. with lab	ESE 4XX Water and Wastewater Eng.	ESE 4XX Water Resource Eng.	ESE 4XX Air Pollution Control	ESE 4XX Hazardous Waste Engineering	ESE 4XX Capstone Design
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		x	x	x	x	x	x	x	x	x	x
	4a: Complete course assignments in an ethical and professional manner	x	x	x	x	x	x	x	x	x	x
	4b: Examine case studies in terms of engineering ethics	x				x	x	x		x	x
	4c: Meet with engineering professionals	x				x	x	x		x	x
	4d: Apply appropriate engineering skills to formulate a solution	x				x	x	x		x	x
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts	x				x	x	x		x	x
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		x	x	x	x	x	x	x	x	x	x
	5a: Work collaboratively on assignments	x	x	x	x	x	x	x	x	x	x
	5b: Perform an active role on a team	x				x				x	x
	5c: Present the outcomes of a team effort	x				x				x	x
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		x				x				x	x
	6a: Understand the theory and procedures of an experiment	x				x				x	x
	6b: Perform the experiment following established protocol	x				x					x
	6c: Analyze the collected data	x				x					x
	6d: Discuss results in laboratory reports	x				x					x
	6e: Draw conclusions and give recommendations based on laboratory results	x				x					x
(7) acquire and apply new knowledge as needed, using appropriate learning strategies		x	x	x	x	x	x	x	x	x	x
	7a: Possess knowledge of fundamentals	x	x	x	x	x	x	x	x	x	x
	7b: Recognize the need to remain current in the field	x	x	x	x	x	x	x	x	x	x
	7c: Be aware of professional engineering organizations	x	x	x	x	x	x	x	x	x	x
	7d: Learn about career opportunities for engineers	x	x	x	x	x	x	x	x	x	x
	7e: Participate in co-curricular activities										
	7f: Read professional documentations and standards	x	x	x	x	x	x	x	x	x	x

Strategies/Environmental and Sustainable Engineering

ABET Program Outcomes	Performance Criteria	ESE 4XX Advanced Wastewater Eng.	ESE 4XX Air Quality Modeling	ESE 4XX Energy Engineering	ESE 4XX Groundwater Hydrology
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		**×**	**×**	**×**	**×**
	1a: Solve textbook problems	×	×	×	×
	1b: Propose a hypothesis for a given problem	×	×	×	×
	1c: Design an experiment to test the hypothesis				
	1d: Analyze experimental data				×
	1e: Solve the problem through an iterative approach	×			×
	1f: Model the problem mathematically and apply standard mathematical and engineering tools	×	×	×	×
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors		**×**	**×**	**×**	**×**
	2a: Establish a plan to solve the problem	×	×	×	×
	2b: Research possible alternatives and assess the likelihood of success	×	×	×	×
	2c: Conduct a risk benefit analysis	×	×	×	×
	2d: Secure necessary resources to execute the plan				
	2d: Revise the plan if needed considering all potential factors	×	×	×	×
(3) communicate effectively with a range of audiences		**×**	**×**	**×**	**×**
	3a: Present solutions to given problems	×	×	×	×
	3b: Write reports and suggest recommendations	×	×	×	×
	3c: Work collaboratively with people from different backgrounds	×	×	×	×

ABET Program Outcomes	Performance Criteria	ESE 4XX Advanced Wastewater Eng.	ESE 4XX Air Quality Modeling	ESE 4XX Energy Engineering	ESE 4XX Groundwater Hydrology
	3d: Participate in group discussions	×	×	×	×
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**×**	**×**	**×**	**×**
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×
	4b: Examine case studies in terms of engineering ethics	×	×	×	×
	4c: Meet with engineering professionals	×	×	×	×
	4d: Apply appropriate engineering skills to formulate a solution	×	×	×	×
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts	×	×	×	×
	4f: Demonstrate alternative approaches for solving a problem	×	×	×	×
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		**×**	**×**	**×**	**×**
	5a: Work collaboratively on assignments	×	×	×	×
	5b: Present the outcomes of a team effort	×	×	×	×
	5c: Perform an active role on a team	×	×	×	×
	5d: Demonstrate effective collaboration with a diverse team members	×	×	×	×

Strategies/Environmental and Sustainable Engineering

ABET Program Outcomes	Performance Criteria	ESE 4XX Advanced Wastewater Eng.	ESE 4XX Air Quality Modeling	ESE 4XX Energy Engineering	ESE 4XX Groundwater Hydrology
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions					
	6a: Understand the theory and procedures of an experiment				
	6b: Perform the experiment following established protocol				
	6c: Analyze the collected data				
	6d: Discuss results in laboratory reports				
	6e: Draw conclusions and give recommendations based on laboratory results				
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**×**	**×**	**×**	**×**
	7a: Possess knowledge of fundamentals	×	×	×	×
	7b: Recognize the need to remain current in the field	×	×	×	×
	7c: Be aware of professional engineering organizations	×	×	×	×
	7d: Learn about career opportunities for engineers	×	×	×	×
	7e: Participate in co-curricular activities				
	7f: Read professional documentations and standards	×	×	×	×

ABET Program Outcomes	Performance Criteria	ABIO 130 General Biology	ABIO 131 General Biology	ABIO 201 Intro to Biological Investigations I	ABIO 202 Intro to Biological Investigations II
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		×	×	×	×
	1a: Solve textbook problems	×	×	×	×
	1b: Propose a hypothesis for a given problem			×	×
	1c: Design an experiment to test the hypothesis			×	×
	1d: Analyze experimental data			×	×
	1e: Solve the problem through an iterative approach			×	×
	1f: Model the problem mathematically and apply standard mathematical and engineering tools				
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors					
	2a: Establish a plan to solve the problem				
	2b: Research possible alternatives and assess the likelihood of success				
	2c: Conduct a risk benefit analysis				
	2d: Secure necessary resources to execute the plan				
	2d: Revise the plan if needed considering all potential factors				

ABET Program Outcomes	Performance Criteria	ABIO 130 General Biology	ABIO 131 General Biology	ABIO 201 Intro to Biological Investigations I	ABIO 202 Intro to Biological Investigations II
(3) communicate effectively with a range of audiences		**×**	**×**	**×**	**×**
	3a: Present solutions to given problems	×	×	×	×
	3b: Write reports and suggest recommendations			×	×
	3c: Work collaboratively with people from different backgrounds			×	×
	3d: Participate in group discussions			×	×
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts					
	4a: Complete course assignments in an ethical and professional manner	**×**	**×**	**×**	**×**
	4b: Examine case studies in terms of engineering ethics	×	×	×	×
	4c: Meet with engineering professionals				
	4d: Apply appropriate engineering skills to formulate a solution				
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts				
	4f: Demonstrate alternative approaches for solving a problem				
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		**×**	**×**	**×**	**×**
	5a: Work collaboratively on assignments	×	×	×	×
	5b: Present the outcomes of a team effort			×	×

ABET Program Outcomes	Performance Criteria	ABIO 130 General Biology	ABIO 131 General Biology	ABIO 201 Intro to Biological Investigations I	ABIO 202 Intro to Biological Investigations II
	5c: Perform an active role on a team			×	×
	5d: Demonstrate effective collaboration with a diverse team members			×	×
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				**×**	**×**
	6a: Understand the theory and procedures of an experiment			×	×
	6b: Perform the experiment following established protocol			×	×
	6c: Analyze the collected data			×	×
	6d: Discuss results in laboratory reports			×	×
	6e: Draw conclusions and give recommendations based on laboratory results			×	×
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**×**	**×**	**×**	**×**
	7a: Possess knowledge of fundamentals	×	×	×	×
	7b: Recognize the need to remain current in the field				
	7c: Be aware of professional engineering organizations				
	7d: Learn about career opportunities for engineers				
	7e: Participate in co-curricular activities				
	7f: Read professional documentations and standards				

ABET Program Outcomes	Performance Criteria	ACHM 120 General Chemistry I	ACHM 121 General Chemistry II	ACHM 124 General Chemistry I Lab	ACHM 125 General Chemistry II Lab
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		×	×	×	×
	1a: Solve textbook problems	×	×	×	×
	1b: Propose a hypothesis for a given problem				
	1c: Design an experiment to test the hypothesis				
	1d: Analyze experimental data				
	1e: Solve the problem through an iterative approach				
	1f: Model the problem mathematically and apply standard mathematical and engineering tools				
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors					
	2a: Establish a plan to solve the problem				
	2b: Research possible alternatives and assess the likelihood of success				
	2c: Conduct a risk benefit analysis				
	2d: Secure necessary resources to execute the plan				
	2d: Revise the plan if needed considering all potential factors				

ABET PROGRAM OUTCOMES	Performance Criteria	ACHM 120 General Chemistry I	ACHM 121 General Chemistry II	ACHM 124 General Chemistry I Lab	ACHM 125 General Chemistry II Lab
(3) communicate effectively with a range of audiences		**×**	**×**	**×**	**×**
	3a: Present solutions to given problems	×	×	×	×
	3b: Write reports and suggest recommendations			×	×
	3c: Work collaboratively with people from different backgrounds			×	×
	3d: Participate in group discussions			×	×
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**×**	**×**	**×**	**×**
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×
	4b: Examine case studies in terms of engineering ethics				
	4c: Meet with engineering professionals				
	4d: Apply appropriate engineering skills to formulate a solution				
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts				
	4f: Demonstrate alternative approaches for solving a problem				
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish		**×**	**×**	**×**	**×**

goals, plan tasks, and meet objectives					
	5a: Work collaboratively on assignments	×	×	×	×
	5b: Present the outcomes of a team effort			×	×
	5c: Perform an active role on a team			×	×
	5d: Demonstrate effective collaboration with a diverse team members			×	×
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				**×**	**×**
	6a: Understand the theory and procedures of an experiment			×	×
	6b: Perform the experiment following established protocol			×	×
	6c: Analyze the collected data			×	×
	6d: Discuss results in laboratory reports			×	×
	6e: Draw conclusions and give recommendations based on laboratory results			×	×
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**×**	**×**	**×**	**×**
	7a: Possess knowledge of fundamentals	×	×	×	×
	7b: Recognize the need to remain current in the field				
	7c: Be aware of professional engineering organizations				
	7d: Learn about career opportunities for engineers				
	7e: Participate in co-curricular activities				
	7f: Read professional documentations and standards				

ABET Program Outcomes	Performance Criteria	CEN 200 Intro to Programming
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		**×**
	1a: Solve textbook problems	×
	1b: Propose a hypothesis for a given problem	
	1c: Design an experiment to test the hypothesis	
	1d: Analyze experimental data	
	1e: Solve the problem through an iterative approach	×
	1f: Model the problem mathematically and apply standard mathematical and engineering tools	×
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors		**×**
	2a: Establish a plan to solve the problem	×
	2b: Research possible alternatives and assess the likelihood of success	×
	2c: Conduct a risk benefit analysis	
	2d: Secure necessary resources to execute the plan	x
	2d: Revise the plan if needed considering all potential factors	×
(3) communicate effectively with a range of audiences		**×**
	3a: Present solutions to given problems	×
	3b: Write reports and suggest recommendations	×
	3c: Work collaboratively with people from different backgrounds	×
	3d: Participate in group discussions	×

ABET Program Outcomes	Performance Criteria	CEN 200 Intro to Programming
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**×**
	4a: Complete course assignments in an ethical and professional manner	×
	4b: Examine case studies in terms of engineering ethics	x
	4c: Meet with engineering professionals	×
	4d: Apply appropriate engineering skills to formulate a solution	×
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts	×
	4f: Demonstrate alternative approaches for solving a problem	×
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		**×**
	5a: Work collaboratively on assignments	×
	5b: Present the outcomes of a team effort	×
	5c: Perform an active role on a team	×
	5d: Demonstrate effective collaboration with a diverse team members	×
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		**×**
	6a: Understand the theory and procedures of an experiment	×
	6b: Perform the experiment following established protocol	×
	6c: Analyze the collected data	×
	6d: Discuss results in laboratory reports	×
	6e: Draw conclusions and give recommendations based on laboratory results	×
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**×**
	7a: Possess knowledge of fundamentals	×
	7b: Recognize the need to remain current in the field	×
	7c: Be aware of professional engineering organizations	×
	7d: Learn about career opportunities for engineers	×
	7e: Participate in co-curricular activities	
	7f: Read professional documentations and standards	×

ABET Program Outcomes	Performance Criteria	E SPH 321 Global Environ-mental Issues and Their Effect on Human Health	E SPH/EHS 323 Environ-mental Laboratory Perspectives in Public Health	E EHS 520 Environ mental Chemistry	E EHS 560 Sustainability Green Design and Public Health
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		×	×	×	×
	1a: Solve textbook problems	×	×	×	×
	1b: Propose a hypothesis for a given problem				
	1c: Design an experiment to test the hypothesis				
	1d: Analyze experimental data				
	1e: Solve the problem through an iterative approach				
	1f: Model the problem mathematically and apply standard mathematical and engineering tools				
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors					×
	2a: Establish a plan to solve the problem				×
	2b: Research possible alternatives and assess the likelihood of success				×
	2c: Conduct a risk benefit analysis				×
	2d: Secure necessary resources to execute the plan				
	2d: Revise the plan if needed considering all potential factors				×

ABET Program Outcomes	Performance Criteria	E SPH 321 Global Environ-mental Issues and Their Effect on Human Health	E SPH/EHS 323 Environ-mental Laboratory Perspectives in Public Health	E EHS 520 Environ mental Chemistry	E EHS 560 Sustainability Green Design and Public Health
(3) communicate effectively with a range of audiences		×	×	×	×
	3a: Present solutions to given problems	×	×	×	×
	3b: Write reports and suggest recommendations				×
	3c: Work collaboratively with people from different backgrounds				×
	3d: Participate in group discussions			×	×
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		×	×	×	×
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×
	4b: Examine case studies in terms of engineering ethics				
	4c: Meet with engineering professionals				×
	4d: Apply appropriate engineering skills to formulate a solution				×
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts				×
	4f: Demonstrate alternative approaches for solving a problem				×

ABET Program Outcomes	Performance Criteria	E SPH 321 Global Environ-mental Issues and Their Effect on Human Health	E SPH/EHS 323 Environ-mental Laboratory Perspectives in Public Health	E EHS 520 Environ mental Chemistry	E EHS 560 Sustainability Green Design and Public Health
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		×	×	×	×
	5a: Work collaboratively on assignments	×	×	×	×
	5b: Present the outcomes of a team effort				
	5c: Perform an active role on a team				
	5d: Demonstrate effective collaboration with a diverse team members				
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				×	
	6a: Understand the theory and procedures of an experiment			×	
	6b: Perform the experiment following established protocol				
	6c: Analyze the collected data				
	6d: Discuss results in laboratory reports				
	6e: Draw conclusions and give recommendations based on laboratory results				

ABET Program Outcomes	Performance Criteria	E SPH 321 Global Environ-mental Issues and Their Effect on Human Health	E SPH/EHS 323 Environ-mental Laboratory Perspectives in Public Health	E EHS 520 Environ mental Chemistry	E EHS 560 Sustainability Green Design and Public Health
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		×	×	×	×
	7a: Possess knowledge of fundamentals	×	×	×	×
	7b: Recognize the need to remain current in the field			×	×
	7c: Be aware of professional engineering organizations			×	×
	7d: Learn about career opportunities for engineers			×	×
	7e: Participate in co-curricular activities				
	7f: Read professional documentations and standards			×	×

Strategies/ENVIRONMENTAL SCIENCE

ABET Program Outcomes	Performance Criteria	A ATM 200: Natural Disasters	A ATM 210/210Z Atmospheric Structure, Thermo-dynamics and Cirulation	A ENV 250 Sustainable Development: Energy and Resources	A ATM 301 Surface Hydrology and Hydro-meteorology	A ATM 304/304Z Air Quality and Air Pollution Policy	A ATM 307/307Z Intro to Atmospheric Chemistry
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		×	×	×	×	×	×
	1a: Solve textbook problems	×	×	×	×	×	×
	1b: Propose a hypothesis for a given problem						
	1c: Design an experiment to test the hypothesis						
	1d: Analyze experimental data						
	1e: Solve the problem through an iterative approach						
	1f: Model the problem mathematically and apply standard mathematical and engineering tools						
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors							
	2a: Establish a plan to solve the problem						
	2b: Research possible alternatives and assess the likelihood of success						
	2c: Conduct a risk benefit analysis						
	2d: Secure necessary resources to execute the plan						
	2d: Revise the plan if needed considering all potential factors						

ABET Program Outcomes	Performance Criteria	A ATM 200: Natural Disasters	A ATM 210/210Z Atmospheric Structure, Thermo-dynamics and Cirulation	A ENV 250 Sustainable Development: Energy and Resources	A ATM 301 Surface Hydrology and Hydro-meteorology	A ATM 304/304Z Air Quality and Air Pollution Policy	A ATM 307/307Z Intro to Atmospheric Chemistry
(3) communicate effectively with a range of audiences		×	×	×	×	×	×
	3a: Present solutions to given problems	×	×	×	×	×	×
	3b: Write reports and suggest recommendations				×		
	3c: Work collaboratively with people from different backgrounds			×	×		
	3d: Participate in group discussions			×	×		
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		×	×	×	×	×	×
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×	×	×
	4b: Examine case studies in terms of engineering ethics						
	4c: Meet with engineering professionals						
	4d: Apply appropriate engineering skills to formulate a solution						
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts						
	4f: Demonstrate alternative approaches for solving a problem						

Strategies/ENVIRONMENTAL SCIENCE

ABET Program Outcomes	Performance Criteria	A ATM 200: Natural Disasters	A ATM 210/210Z Atmospheric Structure, Thermo-dynamics and Cirulation	A ENV 250 Sustainable Development: Energy and Resources	A ATM 301 Surface Hydrology and Hydro-meteorology	A ATM 304/304Z Air Quality and Air Pollution Policy	A ATM 307/307Z Intro to Atmospheric Chemistry
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		×	×	×	×	×	×
	5a: Work collaboratively on assignments	×	×	×	×	×	×
	5b: Present the outcomes of a team effort						
	5c: Perform an active role on a team						
	5d: Demonstrate effective collaboration with a diverse team members						
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions							
	6a: Understand the theory and procedures of an experiment						
	6b: Perform the experiment following established protocol						
	6c: Analyze the collected data						
	6d: Discuss results in laboratory reports						
	6e: Draw conclusions and give recommendations based on laboratory results						

Strategies/ENVIRONMENTAL SCIENCE

ABET Program Outcomes	Performance Criteria	A ATM 200: Natural Disasters	A ATM 210/210Z Atmospheric Structure, Thermo-dynamics and Cirulation	A ENV 250 Sustainable Development: Energy and Resources	A ATM 301 Surface Hydrology and Hydro-meteorology	A ATM 304/304Z Air Quality and Air Pollution Policy	A ATM 307/307Z Intro to Atmospheric Chemistry
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		×	×	×	×	×	×
	7a: Possess knowledge of fundamentals	×	×	×	×	×	×
	7b: Recognize the need to remain current in the field						
	7c: Be aware of professional engineering organizations						
	7d: Learn about career opportunities for engineers						
	7e: Participate in co-curricular activities						
	7f: Read professional documentations and standards						

ABET Program Outcomes	Performance Criteria	AMAT 112 Calculus I	AMAT 113 Calculus II	AMAT 214 Calculus of Several Variables	AMAT 311 Ordinary Differential Equations	AMAT 370 Probability and Stats for Eng
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		**×**	**×**	**×**	**×**	**×**
	1a: Solve textbook problems	×	×	×	×	×
	1b: Propose a hypothesis for a given problem					
	1c: Design an experiment to test the hypothesis					
	1d: Analyze experimental data					×
	1e: Solve the problem through an iterative approach					
	1f: Model the problem mathematically and apply standard mathematical and engineering tools	×	×	×	×	×
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors						**×**
	2a: Establish a plan to solve the problem					
	2b: Research possible alternatives and assess the likelihood of success					×
	2c: Conduct a risk benefit analysis					×
	2d: Secure necessary resources to execute the plan					
	2d: Revise the plan if needed considering all potential factors					

ABET Program Outcomes	Performance Criteria	AMAT 112 Calculus I	AMAT 113 Calculus II	AMAT 214 Calculus of Several Variables	AMAT 311 Ordinary Differential Equations	AMAT 370 Probability and Stats for Eng
(3) communicate effectively with a range of audiences		**×**	**×**	**×**	**×**	**×**
	3a: Present solutions to given problems	×	×	×	×	×
	3b: Write reports and suggest recommendations					
	3c: Work collaboratively with people from different backgrounds					
	3d: Participate in group discussions					
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**×**	**×**	**×**	**×**	**×**
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×	×
	4b: Examine case studies in terms of engineering ethics					
	4c: Meet with engineering professionals					
	4d: Apply appropriate engineering skills to formulate a solution					
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts					
	4f: Demonstrate alternative approaches for solving a problem					

ABET Program Outcomes	Performance Criteria	AMAT 112 Calculus I	AMAT 113 Calculus II	AMAT 214 Calculus of Several Variables	AMAT 311 Ordinary Differential Equations	AMAT 370 Probability and Stats for Eng
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		×	×	×	×	×
	5a: Work collaboratively on assignments	×	×	×	×	×
	5b: Present the outcomes of a team effort					
	5c: Perform an active role on a team					
	5d: Demonstrate effective collaboration with a diverse team members					
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions						×
	6a: Understand the theory and procedures of an experiment					
	6b: Perform the experiment following established protocol					
	6c: Analyze the collected data					×
	6d: Discuss results in laboratory reports					
	6e: Draw conclusions and give recommendations based on laboratory results					×

ABET Program Outcomes	Performance Criteria	AMAT 112 Calculus I	AMAT 113 Calculus II	AMAT 214 Calculus of Several Variables	AMAT 311 Ordinary Differential Equations	AMAT 370 Probability and Stats for Eng
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**×**	**×**	**×**	**×**	**×**
	7a: Possess knowledge of fundamentals	×	×	×	×	×
	7b: Recognize the need to remain current in the field					
	7c: Be aware of professional engineering organizations					
	7d: Learn about career opportunities for engineers					
	7e: Participate in co-curricular activities					
	7f: Read professional documentations and standards					

ABET Program Outcomes	Performance Criteria	APHY 140 or 142 Physics I Mechanics	APHY 150 or 152 Physics II Electro-magnetism	PHY 145 Physics 1 Lab	PHY 155 Physics II Lab
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		×	×	×	×
	1a: Solve textbook problems	×	×	×	×
	1b: Propose a hypothesis for a given problem			×	×
	1c: Design an experiment to test the hypothesis			×	×
	1d: Analyze experimental data			×	×
	1e: Solve the problem through an iterative approach			×	×
	1f: Model the problem mathematically and apply standard mathematical and engineering tools			×	×
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors					
	2a: Establish a plan to solve the problem				
	2b: Research possible alternatives and assess the likelihood of success				
	2c: Conduct a risk benefit analysis				
	2d: Secure necessary resources to execute the plan				
	2d: Revise the plan if needed considering all potential factors				

ABET Program Outcomes	Performance Criteria	APHY 140 or 142 Physics I Mechanics	APHY 150 or 152 Physics II Electro-magnetism	PHY 145 Physics 1 Lab	PHY 155 Physics II Lab
(3) communicate effectively with a range of audiences		**×**	**×**	**×**	**×**
	3a: Present solutions to given problems	×	×	×	×
	3b: Write reports and suggest recommendations			×	×
	3c: Work collaboratively with people from different backgrounds			×	×
	3d: Participate in group discussions			×	×
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**×**	**×**	**×**	**×**
	4a: Complete course assignments in an ethical and professional manner	×	×	×	×
	4b: Examine case studies in terms of engineering ethics				
	4c: Meet with engineering professionals				
	4d: Apply appropriate engineering skills to formulate a solution				
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts				
	4f: Demonstrate alternative approaches for solving a problem				

ABET Program Outcomes	Performance Criteria	APHY 140 or 142 Physics I Mechanics	APHY 150 or 152 Physics II Electro-magnetism	PHY 145 Physics 1 Lab	PHY 155 Physics II Lab
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		×	×	×	×
	5a: Work collaboratively on assignments	×	×	×	×
	5b: Present the outcomes of a team effort			×	×
	5c: Perform an active role on a team			×	×
	5d: Demonstrate effective collaboration with a diverse team members			×	×
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				×	×
	6a: Understand the theory and procedures of an experiment			×	×
	6b: Perform the experiment following established protocol			×	×
	6c: Analyze the collected data			×	×
	6d: Discuss results in laboratory reports			×	×
	6e: Draw conclusions and give recommendations based on laboratory results			×	×
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		×	×	×	×
	7a: Possess knowledge of fundamentals	×	×	×	×
	7b: Recognize the need to remain current in the field				
	7c: Be aware of professional engineering organizations				
	7d: Learn about career opportunities for engineers				
	7e: Participate in co-curricular activities				
	7f: Read professional documentations and standards				

ABET Program Outcomes	Performance Criteria	Source of Assessement	Course Activities	Performance Indicators
(1) identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		**ESE 3XX Intro to Environ. Eng. with lab**		
	1a: Solve textbook problems		Homework problems assigned by the instructor	Students must sucessfully demonstrate completion of readings and satisfactory completion of problems and assignments, as outlined in the syllabus.
	1b: Propose a hypothesis for a given problem		Students respond to problems given by the instructor	Students are able to propose hypotheses for given problems
	1c: Design an experiment to test the hypothesis		All students must attend a weekly 2-hour lab.	Working in groups, student must demostrate background knowledge for certain procedures, design and conduct the experiments. Lab attendance is required.
	1d: Analyze experimental data		Students collect experimental data at designated time interval.	Students analyze and discuss all collected data and make conclusions.
	1e: Solve the problem through an iterative approach		Alternative solutions or improvement of a previous experiment will be performed.	Students are able to improve the experimental design or choose alternative solutions for solve the problem.
	1f: Model the problem mathematically and apply standard mathematical and engineering tools		Students use certain formulas or tools to model the obtained data.	Students are able to model the collected data and make predictions for similar cases.
(2) apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors		**ESE 4XX Capstone Design**		
	2a: Establish a plan to solve the problem		Students read, understand and discuss the the given problem.	Working in groups, after discussion and elaboration, students establish a plan to solve the problem.
	2b: Research possible alternatives and assess the likelihood of success		Students conduct literature review, site visits and collect necessary background information for the given problem.	Students identify several solutions for the given problems and perform a preliminary comparative analysis of the solutions.

	2c: Conduct a risk benefit analysis		More information is collected in terms of public health, safety, welfare, global, cultural, social, environmental and economic parameters.	Students perform a detailed risk benefit analysis for identified solutions considering all of the factors. One plan or solution is chosen.
	2d: Secure necessary resources to execute the plan		Students obtain resources and start the execulation of the plan.	Working in teams, students execute the identified solutions with hands-on activities.
	2d: Revise the plan if needed considering all potential factors		The plan is revised if unexpected factors come to surface.	Students revisit and revise the plan to make it more cost-effective and environmentally friendly.
(3) communicate effectively with a range of audiences		**ESE 4XX Energy Engineering**		
	3a: Present solutions to given problems		Students give oral presentations on topics they choose.	Students must demonstrate broad and deep knowledge on their chosen topic and excellent oral and graphical presentation skills.
	3b: Write reports and suggest recommendations		Students write reports on their chosen topic and follow requirement and guideline for report writing.	Written reports must follow the required format including recommended sections, font and page requirement.
	3c: Work collaboratively with people from different backgrounds		Students work with others from other disciplines.	For group projects, students must demonstrate professional behavior toward collaboration and teamwork.
	3d: Participate in group discussions		Students help each other to understand the concepts and complicated problems.	Students are able to express their own ideas and opinions while listening and learning from others.
(4) recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts		**ESE 4XX Advanced Wastewater Eng.**		
	4a: Complete course assignments in an ethical and professional manner		Students work on course assignments as instructed.	Students demonstrate professional integrity by strictly following instructions given by the course instructor. Students must not discuss assignments with others if not allowed to do so.

	4b: Examine case studies in terms of engineering ethics		Students read and discuss articles or documents presenting case studies related to ethics.	Students demonstrate understanding of engineering ethics and give examples of good vs. bad behaviors regarding ethics.
	4c: Meet with engineering professionals		Students take field trips to water treatment plants and wastewater treatment plants	Students meet practicing engineers and discuss technical, ethical and professional questions with them.
	4d: Apply appropriate engineering skills to formulate a solution		Students work on solutions for water reuse and nutrient removal from wastewater.	Students apply theories, tools and knowledge learned from the class to identify solutions for tertiary wastewater treatment.
	4e: Evaluate solutions in globlal, economic, environmental and societal contexts		Students exercise their solutions using a holistic approach.	Students evaluate different solutions considering global, economic, environmental and society contexts besides technical aspects.
(5) function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		**ESE 4XX Capstone Design**		
	5a: Work collaboratively on assignments		Students work together on assignments.	Students discuss the assignments in a team environment and agree on work allocation. Each student works on things that he or she is good at.
	5b: Perform an active role on a team		Students are actively engaged in assigned work.	Students devote time and effort to individually assignd work, meet regularly to discuss the project, seek guidance from course advisor and try hard to put all pieces together seamlessly.
	5c: Present the outcomes of a team effort		Students present the final outcome in oral presentation and report.	Students within a team present their work together. Each one presents a part of the assigned work that he or she has been working on. The whole team will address questions from the audience and the advisory board.
(6) develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		**ESE 4XX Water Resource Eng.**		

	6a: Understand the theory and procedures of an experiment		Students read related literature and understand what will be performed in the lab.	Students understand every step of the experiment, the theory and background information behind the procedures.
	6b: Perform the experiment following established protocol		Students conduct the experiment accoriding to required procedures.	Working in groups, students start the experiment and collect data at different time points.
	6c: Analyze the collected data		Students analyze the data together in a group.	Students graph or table the collected data and see whether expectations are met.
	6d: Discuss results in laboratory reports		Students write laboratory reports including a discussion section.	Students discuss and compare their results with what are reported in the literature.
	6e: Draw conclusions and give recommendations based on laboratory results		Students make conclusions and provide recommendations for future labs.	Based on results' analysis,, students draw conclusion from the laboratory activities. If results cannot be explained by theory, provide ways to troubleshoot and give recommendations for what need to be corrected.
(7) acquire and apply new knowledge as needed, using appropriate learning strategies.		**ESE 4XX Hazardous Waste Engineering**		
	7a: Possess knowledge of fundamentals		Students learn basic theory and concepts related to the topic.	Students truly grasp the fundamental theory, practices and processes tied to hazardous waste treatment.
	7b: Recognize the need to remain current in the field		Students learn that new approaches are being developed and needed all the time.	Students recognize the need of life-long learning. New technologies are needed to meet regulatory requirements and improve people's living standards.
	7c: Be aware of professional engineering organizations		Students are given list of professional organizations in the environmental field.	Students become members of environmental engineering professional societies. They actively participate in conferences and activities held by different societies and contribute their knowledge and time to these societies.
	7d: Learn about career opportunities for engineers		Students are advised regarding career opportunities.	Students have a good knowledge of where to find engineering jobs and how to grow their professioinal life.
	7e: Participate in co-curricular activities		Students are guided toward extracurriculum engineering activities.	Students work on summer internships, get involved in professional society, such as Engineers without Border and volunteer on other opportunities.
	7f: Read professional documentations and standards		List of professional documents and standards are given to the students.	Students have the habit of reading and educating themselves to keep up with new research and development in the environmental field.

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 3

Catalog descriptions of existing courses

Mathematics

A MAT 112 Calculus I (4)
Calculus of one variable. Limits, continuity, differentiation of algebraic functions, applications of differentiation, anti-derivatives, the definite integral, transcendental functions. A MAT 118 is the honors version of A MAT 112 and substitutes for A MAT 112 toward the prerequisite in any course. Only one of A MAT 111, 112, 118/118H and T MAT 118 may be taken for credit. Prerequisite(s): A MAT 100 or precalculus at the high school or college level. Students without precalculus should elect A MAT 101.

A MAT 113 Calculus II (4)
Techniques of integration, applications of the definite integral, conics, polar coordinates, improper integrals, infinite series. A MAT 119 is the honors version of A MAT 113 and substitutes for A MAT 113 toward the prerequisite in any course. Only one of A MAT 113, 119/119H and T MAT 119 may be taken for credit. Prerequisite(s): A MAT 111 or 112.

A MAT 214 Calculus of Several Variables (4)
Curves and vectors in the plane, geometry of three-dimensional space, vector functions in three-space, partial derivatives, multiple integrals, line and surface integrals. Prerequisite(s): A MAT 113 or 119.

A MAT 311 Ordinary Differential Equations (3)
Linear differential equations, systems of differential equations, series solutions, boundary value problems, existence theorems, applications to the sciences. Prerequisite(s): A MAT 214.

A MAT 370 Probability and Statistics for Engineering and the Sciences (3)
Basic probability, conditional probability and independence, families of discrete and continuous random variables, expected values and variances, moment generating functions, bivariate distributions, Bayesian networks, law of large numbers and central limit theorem, normal, t, and chi-square distributions, confidence intervals and hypothesis testing and simple linear regressions. A MAT 370 is a one semester introduction to probability and statistics intended primarily for science or engineering majors who have completed two semesters of calculus. Students cannot apply both A MAT 362 and A MAT 370 or both A MAT 363 and A MAT 370 toward the requirements for a Mathematics major. A MAT 370 fulfills the probability/statistics requirement for the Mathematics BA. A MAT 367 and A MAT 370 can be one of the two sequences required for the B.S. in Mathematics. Students who expect to do graduate work in mathematics or statistics should take both A MAT 362 and A MAT 363, not A MAT 370. Prerequisite(s): A MAT 367 or I CEN/I CSI 210. Offered fall semester only.

Biological Sciences

A BIO 130 (formerly A BIO 121) General Biology: Molecular and Cell Biology and Genetics (3)
Formerly A BIO 121. First course in a two semester sequence which offers a comprehensive survey of the structures and functions common to all living systems at the molecular, cellular, organismal, and population levels. This course emphasizes molecular and cell biology, and genetics. May not be taken for credit by students who have credit for A BIO 111 or A BIO 121.

A BIO 131 (formerly A BIO 120) General Biology: Ecology, Evolution, and Physiology (3)
Formerly A BIO 120. Second course in a two semester sequence which offers a comprehensive survey of the structures and functions common to all living systems at the molecular, cellular, organismal, and population levels. This course emphasizes evolutionary principles, ecology, anatomy and physiology. May not be taken for credit by students who have credit for A BIO 110 or A BIO 120. Students must

complete A BIO 131 with a *C*- or better to register for A BIO 212Y or A BIO 217. Prerequisite(s): A BIO 130 or A BIO 121.

A BIO 201 (formerly A BIO 122) Introduction to Biological Investigations I (1)
First course in a two-semester laboratory sequence designed for biology majors. Students will learn the process of scientific investigation, collaborate in designing, conducting and analyzing experiments, develop the ability to communicate in scientific format and gain expertise in a variety of laboratory instrumentation, techniques, skills and procedures. One laboratory period per week. May not be taken by students with credit for A BIO 110 or A BIO 122. Prerequisite(s): A BIO 120 or A BIO 131, A BIO 121 or A BIO 130, and A CHM 120, 121, 124, 125. Offered fall semester only. Course fee applies. Consult the Schedule of Classes.

A BIO 202Z (formerly A BIO 123Z) Introduction to Biological Investigations II (1)
Second course in a two-semester laboratory sequence designed for biology majors. Students will learn the process of scientific investigation, collaborate in designing, conducting and analyzing experiments, develop the ability to communicate in scientific format and gain expertise in a variety of laboratory instrumentation, techniques, skills and procedures. One laboratory period per week. May not be taken by students with credit for A BIO 111 or 123Z. Prerequisite(s): A BIO 120 or A BIO 131, A BIO 121 or A BIO 130, A BIO 201, and A CHM 120, 121, 124, 125. Offered spring semester only. Course fee applies. Consult the Schedule of Classes.

Chemistry

A CHM 120 General Chemistry I (3)
Atomic theory, quantitative relationships in chemical change, electronic structure of atoms and chemical periodicity, chemical bonding, and states of matter.

A CHM 121 General Chemistry II (3)
Elementary principles of chemical equilibrium, thermodynamics, and kinetics; electrochemistry; descriptive chemistry of the elements and their compounds. Prerequisite(s): A CHM 120 or 130.

A CHM 124 (formerly A CHM 122A) General Chemistry Laboratory I (1)
Introduction to laboratory techniques, experiments demonstrating chemical principles in General Chemistry I, including stoichiometry, calorimetry, and properties of some elements and compounds. Prerequisite(s) or corequisite(s): A CHM 120 or 130. Course fee applies. Consult the Schedule of Classes.

A CHM 125 (formerly A CHM 122B) General Chemistry Laboratory II (1)
Application of laboratory techniques, experiments demonstrating chemical principles of General Chemistry II, including solution properties, kinetics, equilibrium, and qualitative analysis of some anions and cations. Prerequisite(s): A CHM 124. Prerequisite(s) or corequisite(s): A CHM 121 or 131. Course fee applies. Consult the Schedule of Classes.

Geography

A GOG 360 (= A USP 360) Introduction to Geographic Information Systems (3)
This is an introductory course to the world of Geographic Information Systems (GIS). The course introduces principles of GIS and their applications in spatial analysis and information management. The course is designed to give students an understanding of cutting-edge geospatial technologies, their capabilities, uses, and limitations. Representative applications for each discipline area are demonstrated in the computer laboratory portion.

A GOG 496 (= A USP 456) Geographic Information Systems (3)
Introduction to the structure, design, and application of data base management systems designed to accept large volumes of spatial data derived from various sources. The student will learn how to efficiently store, retrieve, manipulate, analyze, and display these data according to a variety of user-defined specifications. Prerequisite(s): familiarity with maps and coordinate systems.

Physics

A PHY 140 Physics I: Mechanics (3)
An introduction to the fundamentals of physics: Classical Mechanics. Topics include the concepts of force, energy and work applied to the kinematics and dynamics of particles and rigid bodies and an introduction to special relativity. Only one of A PHY 140, A PHY 141 or T PHY 141 or A PHY 142 may be taken for credit. Prerequisite or corequisite: A MAT 111 or A MAT 112 or A MAT 118. Generally offered fall semester only.

A PHY 142 Physics I: Advanced Mechanics (3)
An introduction to the fundamentals of physics, Classical Mechanics. Topics include the concepts of force, energy and work applied to the kinematics and dynamics of particles and rigid bodies. This course is designed for students who are interested in careers in physical science and engineering and who are well prepared to take a more advanced course in introductory physics. Course content expands on the content of A PHY 140, A PHY 141 and T PHY 141. More advanced textbook is used. Students with a strong interest in physical sciences should consider taking A PHY 142 instead of A PHY 140, 141 or T PHY 141. Only one of A PHY 140, A PHY 141, T PHY 141, or A PHY 142 may be taken for credit. Prerequisite(s) or corequisite(s): A MAT 111 or A MAT 112

A PHY 145 Physics Lab I (1)
Experiments in mechanics. One laboratory period each week. Prerequisite or corequisite: A PHY 140, A PHY 141 or T PHY 141 or A PHY 142. Offered fall semester only.

A PHY 150 Physics II: Electromagnetism (3)
An introduction to the fundamentals of physics: electrostatics and magnetism, including the concepts of the electric and magnetic fields, electric potential and basic circuits; the laws of Gauss, Ampere, and Faraday; Maxwell’s equations; geometrical optics. Prerequisite or corequisite: A MAT 113 or A MAT 119; prerequisite: A PHY 140, A PHY 141, or T PHY 141 or A PHY 142. Generally offered spring semester only.

A PHY 152 Physics II: Advanced Electromagnetism (3)
An introduction to the fundamentals of physics: electrostatics and magnetism, including the concepts of the electric and magnetic fields, electric potential and basic circuits; the laws of Gauss, Ampere and Faraday; Maxwell's equations. This course is designed for students who are interested in careers in physical science and engineering and who are well prepared to take a more advanced course in introductory physics. Course content expands on the content of A PHY 150, A PHY 151, and T PHY 151. More advanced textbook is used. Students with a strong interest in physical sciences should consider taking A PHY 152 instead of A PHY 150, A PHY 151, or T PHY 151. Only one of A PHY 150, A PHY 151, T PHY 151, or A PHY 152 may be taken for credit. Prerequisite(s) or corequisite(s): A MAT 113 or A MAT 119; prerequisite(s): A PHY 140 or A PHY 141 or T PHY 141 or A PHY 142.

A PHY 155 Physics Lab II (1)
Experiments in electricity and magnetism, circuits, and optics. One laboratory period each week.

Prerequisite or corequisite: A PHY 150, A PHY 151, or T PHY 151 or A PHY 152. Offered spring semester only.

Environmental Sciences

A ATM 200 Natural Disasters (3)
Disasters due to natural phenomena such as climate change, hurricanes, tornadoes, earthquakes, tsunami, volcanic eruptions, asteroid/comet impacts, and mass extinctions are examined from an environmental perspective; each type of event will be characterized in terms of its origin, evolution, warning potential, range of significant environmental impacts and possible mitigation strategies; historical case studies will be analyzed; additional student selected topics may include ice storms, blizzards, landslides, avalanches, floods, drought, fire, heat and cold waves. Does not yield credit toward the major in atmospheric science.

A ATM 210/210Z Atmospheric Structure, Thermodynamics, and Circulation (3)
Technical survey of the atmosphere with application of elementary physical and mathematical concepts to the horizontal and vertical structure of the atmosphere; planetary, regional and local circulations; weather systems; atmospheric radiation; precipitation physics and thermodynamics. Prerequisite(s): A MAT 111 or A MAT 112 or A MAT 118; A PHY 140 or A PHY 141. A ATM 210Z is writing intensive version of A ATM 210; only one may be taken for credit.

A ENV 250 Sustainable Development: Energy and Resources (3)
Examination of energy production using non-renewable (coal, oil, natural gas, uranium) versus renewable resources (hydroelectric, solar, wind, geothermal) relative to present and future environmental and societal impacts. A transition to a more sustainable renewable energy infrastructure presents challenges and opportunities that will be examined in this course. In addition to the traditional energy resources, the course covers the sustainability of other mineral resources that may be important in this transition. Prerequisite(s): A CHM 120 or A CHM 130 or T CHM 130; A MAT 111 or A MAT 112 or T MAT 118; A PHY 140 or T PHY 141. Offered spring semester only.

A ATM 301 Surface Hydrology and Hydrometeorology (3)
A survey of the water cycle and its interactions with the earth and atmosphere, including the processes of precipitation, evaporation, and stream flow. Water resources and policy issues incorporated where applicable. Not open to students with credit in A ATM 408. Prerequisite(s): A ATM 210. Offered alternate fall semesters. Will next be offered fall 2017.

A ATM 304/304Z Air Quality and Air Pollution Policy (3)
Designed for undergraduate students not pursuing the B.S. in Atmospheric Science. This course deals with scientific, policy, and regulatory issues associated with air quality for the ambient (outdoor) environment and indoor environments. Topics include pollutant sources, transport, transformation and deposition, environmental and human health consequences, air quality and emission standards, basic air pollution monitoring and abatement methods, and legislation and policies in historical perspective. Does not yield upper level credit for the Atmospheric Science degree. Only one version of A ATM 304 may be taken for credit. Prerequisite(s): A ATM 210; A MAT 111 or A MAT 112 or T MAT 118; A PHY 140 or T PHY 141. Offered alternate fall semesters. Will next be offered fall 2017.

A ENV 315 (= A ATM 315) Environmental Statistics and Computation (4)
This course builds an understanding of natural systems through an introduction to statistical and computational methods used to analyze atmospheric and environmental data. Key goals of the course are to become proficient at drawing conclusions about the behaviors of natural systems using common visualizing methods and statistically analyzing data from observations and dynamical models in a variety of Earth-systems applications. Includes a concise but comprehensive introduction to computation and programming methods suited for students with no background in computer coding via the general-purpose programming language Python. Only one version of A ATM/A ENV 315 may be taken for credit. Prerequisite(s): A ATM 210, A MAT 111 or 112 or T MAT 118; A MAT 220 recommended.

Public Health

H SPH 321 Global Environmental Issues and Their Effect on Human Health (3)
Globalization has made the earth a much smaller place so that we can no longer focus merely on issues in the United States. This course will address global environmental concerns and their impact on human change, atmospheric pollution, sanitation, etc., within the context of their impacts on populations throughout the world. Faculty and invited lecturers will be guest presenters. Prerequisite(s): one semester of college-level course in biology or chemistry.

H SPH 323 (= H EHS 323) Environmental Laboratory Perspectives in Public Health (3)
The course will define current public health issues in environmental health sciences, highlighting emerging concerns faced by researchers and practitioners. This course will explore environmental agents of disease, including elemental, organic and biological current and emerging contaminants from an environmental laboratory perspective. The course will define characteristics of and describe toxicological and analytical considerations of disease derived from environmental agents. Heavy emphasis will be placed on how laboratory techniques have driven policy and regulation. Only one version may be taken for credit. Prerequisite(s): one year of college-level biology.

EHS 520 Principles of Environmental Chemistry (3)
A survey of known environmental pollutants undertaken to familiarize students with the processes of evolution, emission, transport and disposition of these compounds in the environment. Prerequisite: Two years of college chemistry or the consent of the instructor.

EHS 560 Sustainability, Green Design and Public Health (3)
This course covers the theory, principles and measures of sustainability and public health. Through hand-on projects and real-world cases, the students will work with governmental, industrial and non-profit organization partners to assess the environmental footprints and health impacts of their products and services, and suggest the sustainable interventions.

Computer Engineering

I CSI 201 (= I CEN 201) Introduction to Computer Science (4)
Computer algorithms and their representation. The principle of information hiding and its relation to program block structure. File structure and access methods. The efficient use of computational resources. Program development and style. Only one of I CEN 200 and I CEN/I CSI 201 may be taken for credit.

I CEN 210 (= I CSI 210) Discrete Structures (4)

Proofs by induction; mathematical reasoning, propositions, predicates and quantifiers; sets; relations, graphs, and trees; functions; counting, permutations and combinations. Only one version may be taken for credit. Prerequisite(s) or corequisite: High School mathematics through pre-calculus and A MAT 112.

Urban Studies and Planning

A USP 452 (formerly A PLN 452) CADD in Planning (3)
Applies the concepts and theories underlying Computer Aided Design and Drafting (CADD) to site planning, urban design, and land-use mapping, including 2D concept diagrams, site plan detail and 3D perspectives. Also reviews rendering, 4D applications, visualization, and CADD management.

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 4

Syllabi for new courses

ESE 110 Introduction to Engineering

ESE 2XX Statics

ESE 2XX Strength of Materials

ESE 3XX Fluid Mechanics

ESE 3XX Intro to Environmental and Sustainable Engineering

ESE 4XX Water and Wastewater Treatment

ESE 4XX Water Resource Engineering

ESE 4XX Advanced Wastewater Engineering

ESE 4XX Air Pollution Control

ESE 4XX Air Quality Modeling

ESE 4XX Energy Engineering

ESE 4XX Groundwater Hydrology

ESE 4XX Hazardous Waste Management

ESE 4XX Capstone Senior Design

University at Albany / Electrical and Computer Engineering

Introduction to Engineering

ESE/CEN 110 Section xxxx

Credits: 2

Term/Year

Meeting Time: TBD

This course will meet 110 minutes/week

Location: TBD

Instructor	Guy Cortesi
Instructor Title	Professor of Practice, ECE
Office Location	Li80
Office hours	TBD
E-mail Address	gcortesi@albany.edu
TA's / Peer Educators	TBD
Prepared By	Guy Cortesi

Textbooks:

Engineering Fundamentals: An Introduction to Engineering, 5th Edition Saeed Moaveni ISBN-13: 9781305084766 (2016)

COURSE DESCRIPTION / OVERVIEW:

An introduction to engineering, including problem solving and other skill sets essential for engineers. Using a combination of assignments and classroom lectures and presentations, students will learn how to formulate, articulate, and solve engineering problems, and how to present engineering work in written form. Students will learn about the different disciplines within engineering and the multidisciplinary nature of modern engineering. Students will gain a better understanding of how fundamental scientific principles relate to engineering. Finally, students will use analysis tools such as Matlab and Excel to solve engineering problems.

PREREQUISITE/COREQUISITE:

AMAT 112 or AMAT 118 Calculus I

LEARNING OBJECTIVES / OUTCOMES: After completing the course, students will:

- Be able to articulate and understand what an engineer is and what an engineer does. They will also gain an understanding of various engineering disciplines such as electrical, computer, software, mechanical, civil, environmental, etc.
- Explore professional ethic issues
- Understand the design process—the basic methodology of problem solving
- Understand contemporary issues in engineering
- Be exposed to an introduction to the central topics of the engineering discipline and related interdisciplinary fields.
- Gain an explicit rather than tacit understanding of the procedures, practices, methodology and fundamental assumptions of the engineering discipline and its related interdisciplinary fields.
- Be exposed to multiple perspectives on the subject matter and field of engineering and its related interdisciplinary fields. Use various analysis tools such as Excel and Matlab to solve engineering problems.
- Use various analysis tools such as Excel and Matlab to solve engineering problems.

COURSE WEBSITE AND BLACKBOARD:

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:

The accomplishment of course objectives will be assessed by applying the concepts and tools for engineering design in a combination of team and individual assignments/labs/projects, tests, and a final project that includes research and design, a written component, and an oral presentation.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 40% of the final grade.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

Exams (2) 30% (15 points each)
Assignments (6) 60% (10 points each)
Class Participation and Attendance: 10%
Total possible points = 100

Grading Scale

A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Timely Assessment

Patterns of testing, assignments, and examinations vary widely across departments and courses. It is important, however, that students in all courses be provided with assessment of their progress in a timely way. Students will receive some formal assessment of their progress well before the last date to withdraw from a course.

Student Conduct

Student and staff/faculty interactions in the class room and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the class room may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class

Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (one approved by either instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

Students With Disabilities

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage

http://www.albany.edu/disability/faculty-staff.shtml.

Title IX

The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin

(http://www.albany.edu/undergraduate_bulletin/regulations.html).

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific h/w and lab assignments and materials will be

provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Class	Day	Date	Topic	Readings	Notes
			PART 1 – Engineering Intro		
1			Intro to Course Intro to Engineering – what is an engineer? Common Traits of Good Engineers	Chapter 1	
2			Preparing for Engineering Careers, time management, student and professional profiles	Chapter 2	
3			Intro to the Design Process – teaming, project management / scheduling, case studies	Chapter 3	Assignment 1 Due
4			Engineering Communication - written and oral skills, graphical communication, presenting	Chapter 4	
5			Engineering Ethics – engineering creed and codes	Chapter 5	Assignment 2 Due
			PART 2 – Engineering Fundamentals		
6			Dimensions and Units in Engineering – significant digits, unit conversion	Chapter 6	
7			Length Variables in Engineering – Radians, Strain, Area, Volume	Chapter 7	
8			Time Variables in Engineering – Period and Frequency, Angular speed and acceleration, linear	Chapter 8	Assignment 3 Due
			Exam 1		
9			Mass Variables in Engineering – flow rates, momentum, kinetic energy, density, specific volume	Chapter 9	
10			Force Variables in Engineering – force, torque, work, moment, energy, power pressure stress, elasticity, ridigity	Chapter 10	
11			Temperature Variables in Engineering – temperature difference, heat transfer, thermal expansion, specific heat	Chapter 11	
12			Intro to Electric Circuits – charge and current density, voltage, current, resistance,impedance	Chapter 12	
			PART 3 – Resources for Engineering Design		
12			Intro to Using Excel for Engineering Analysis	Chapter 14	
13			Intro to Using Matlab Engineering Analysis	Chapter 15	
14			Finish Using Excel & Matlab for Engineering Analysis/Wrap-up		Assignment 6 Due
15			Exam 2		

University at Albany / Environmental and Sustainable Engineering
Statics
3 Credits
ESE 2XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Engineering Mechanics: Statics & Dynamics, 14th Edition
Russell C. Hibbeler, Pearson
ISBN-13: 978-0133915426
ISBN-10: 0133915425

COURSE DESCRIPTION / OVERVIEW
This course will cover the principles of statics and dynamics. Specific topics include: force systems; equilibrium of particles and rigid bodies; trusses; frames; 2-D centroids; friction; moments of inertia; distributed loads; centroids; internal forces; and mass moment of inertia.

PREREQUISITES
AMAT 113 Calculus II

COREQUISITES
AMAT 214 Calculus of Several Variables

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course, students will be able to:

1. describe the defining characteristics of a vector and express a force or moment as a vector,
2. formulate and solve equilibrium equations for a particle and a rigid body,
3. analyze problems in a logical and systematic manner, including the ability to draw free-body diagrams,
4. conduct kinematic and kinetic analyses for particles in terms of force and acceleration, work and energy and impulse and momentum,
5. Analyze internal forces and moments in members and calculate centroids and moments of inertia.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

6. Solve engineering problems on stresses and strains of structural members under various loading conditions.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Quiz	5%
Mid-term (2)	25% (each)
Final	25%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class

Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials

will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Stress	Chapter 1	
2	Strain	Chapter 2	Homework 1 due
3	Mechanical Properties of Materials	Chapter 3	
4	Axial Load	Chapter 4	Homework 2 due
5	Torsion	Chapter 5	
6	Bending	Chapter 6	Homework 3 due
7	Review and First Midterm		
8	Transverse Shear	Chapter 7	Homework 4 due
9	Combined Loadings	Chapter 8	
10	Stress Transformation	Chapter 9	Homework 5 due
11	Strain Transformation	Chapter 10	
12	Review and First Midterm		
13	Design of Beams and Shafts	Chapter 11	Homework 6 due
14	Deflection of Beams and Shafts	Chapter 12	
15	Buckling of Columns	Chapter 13	Homework 7 due
16	Energy Methods	Chapter 14	
17	Review and Final exam		

University at Albany / Environmental and Sustainable Engineering
Strength of Materials
3 Credits
ESE 2XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Mechanics of Materials, 10th Edition
Russell C. Hibbeler, Pearson

ISBN-13: 978-0134319650
ISBN-10: 0134319656

COURSE DESCRIPTION / OVERVIEW
This course presents the theory and supports the application of essential mechanics of materials principles. Topics covered include: stress and strain; young's modulus; shear modulus and pisson's ratio; loading conditions: axial, torsional, transverse shear, bending and combined; elongation of axial members, deflection of beams and shafts; buckling of columns; and energy methods.

PREREQUISITES
ESE 2XX Statics,
AMAT 214: Calculus of Several Variables

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course, students will be able to:

1. Articulate axially loaded members, torsion, change of length, angle of twist, transmission of power by shafts, and statically indeterminate structures,
2. Grasp the concepts of deflection of beams, diff erential equation of deflection curve, method of superposition, and Castiglianos theorem,
3. Understand the concepts of stress and strain, normal stress and strain, shear stress and strain, general state of stress, and design of simple connections,

4. Understand stress analysis, materials' behavior, constitutive relationship, Hookes law, stress concentration, St Venant principle, transformation equations, and Mohrs circle,
5. Understand bending, shear and moment diagrams, shear force, transverse loading relationship, and flexure formulas,
6. Solve engineering problems on stresses and strains of structural members under various loading conditions.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Quiz	5%
Mid-term (2)	25% (each)
Final	25%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of

course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url:
http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Stress	Chapter 1	
2	Strain	Chapter 2	Homework 1 due
3	Mechanical Properties of Materials	Chapter 3	
4	Axial Load	Chapter 4	Homework 2 due
5	Torsion	Chapter 5	
6	Bending	Chapter 6	Homework 3 due
7	Review and First Midterm		
8	Transverse Shear	Chapter 7	Homework 4 due
9	Combined Loadings	Chapter 8	
10	Stress Transformation	Chapter 9	Homework 5 due

11	Strain Transformation	Chapter 10	
12	Review and First Midterm		
13	Design of Beams and Shafts	Chapter 11	Homework 6 due
14	Deflection of Beams and Shafts	Chapter 12	
15	Buckling of Columns	Chapter 13	Homework 7 due
16	Energy Methods	Chapter 14	
17	Review and Final exam		

University at Albany / Environmental and Sustainable Engineering
Fluid Mechanics
3 Credits
ESE 3XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Mechanics of Materials, 10th Edition
Russell C. Hibbeler, McGraw-Hill

ISBN-13: 978-0072432022
ISBN-10: 0072432020

COURSE DESCRIPTION / OVERVIEW
This course introduces the concepts and applications of fluid mechanics. Topics covered include: fluid properties and statics; energy, momentum and forces in fluid flow; steady flow in pressure conduits and open channels; and fluid measurements.

PREREQUISITES
APHY 140 or 142: Physics I: Mechanics,
ESE 2XX Statics,
AMAT 214: Calculus of Several Variables,
ESE 2XX Strength of Materials

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course, students will be able to:

1. Describe fluid properties, such as density, specific weight, and viscosity
2. Explain friction losses and roughness in pipes, pipeline flow and pumps and turbines in pipe flow
3. Understand open channel flow and associated terms, such as uniform flow, specific energy, momentum and the hydraulic jump and gradually-varied flow.
4. Use differential equations to understand pressure and velocity variations

5. Describe and apply control volume analysis, the continuity, moment and energy principles to fluid motion, and dimensional analysis in prototyping.

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Quiz	5%
Mid-term (2)	25% (each)
Final	25%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Introduction	Chapter 1	
2	Properties of Fluids	Chapter 2	Homework 1 due
3	Fluid Statics	Chapter 3	
4	Basics of Fluid Flow	Chapter 4	Homework 2 due
5	Energy in Steady FLow	Chapter 5	
6	Momentum and Forces in Fluid Flow	Chapter 6	Homework 3 due
7	Review and First Midterm		
8	Similitude and Dimensional Analysis	Chapter 7	Homework 4 due
9	Steady Incompressible Flow in Pressure Conduits	Chapter 8	
10	Forces on Immersed Bodies	Chapter 9	
11	Steady Flow in Open Channels	Chapter 10	Homework 5 due
12	Fluid Measurement	Chapter 11	
13	Review and Second Midterm		
14	Unsteady-Flow Problems	Chapter 12	Homework 6 due
15	Steady Flow of Compressible Fluids	Chapter 13	
16	Ideal Flow Mathematics	Chapter 14	Homework 7 due
17	Review and Final exam		

University at Albany / Environmental and Sustainable Engineering
Intro to Environmental and Sustainable Engineering
3 Credits
ESE 3XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Principles of Environmental Engineering & Science, 3rd Edition, 2013
by Mackenzie L Davis and Susan J Masten
ISBN-13: 978-0073397900
ISBN-10: 0073397903

COURSE DESCRIPTION / OVERVIEW
This course introduces students to the broadness of Environmental Engineering. Topics, such as ecosystem, risk assessment, hydrology, sustainability, water quality management, water treatment, wastewater treatment, air pollution, solid and hazardous waste engineering, and noise pollution. These technical aspects are supported by knowledge and information gained from basic sciences, in particular, biology and chemistry. Engineering tools, such as mass balance will be taught and used extensively in this course.
Laboratory supply fee: $30.

PREREQUISITES
Prerequisite: A BIO 131, ACHM 121, AMAT 311

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Be able to tell what Environmental Engineering is and understand the complexity and breath of environmental problems
- Can apply the principles of math and science to technical problems
- Be skilled in using mass balance for solving environmental problems
- Be familiar with terminology used in different subjects, such as water treatment, wastewater treatment and hydrology
- Be able to understand how common environmental tests are performed
- Have experience working in a team environment
- Gain experience in analyzing laboratory data and writing laboratory reports
- Have appreciation toward sustainability

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, exams, and lab reports. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Quiz	5%
Mid-term (2)	15% (each)
Final	20%
Attendance	5%
Lab	25%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Basic chemistry concepts	Chapter 1, 2:1-2	
2	Organic, water, atmospheric chemistry	Chapter 2: 3-6	
3	Biology: the cell	Chapter 3: 1-5	Homework 1 due
4	Material and mass balance	Chapter 4: 1-4	
5	Hydrology	Chapter 7	Homework 2 due
6	Review and Midterm I		
7	Ecosystems	Chapter 5	
8	Risk assessment	Chapter 6	Homework 3 due
9	Energy, mineral and soil resources	Chapter 8	
10	Review and Midterm II		
11	Water pollutants and management	Chapter 9: 1-4	Homework 4 due
12	Water pollutants and management	Chapter 9: 1-4	
13	Water treatment	Chapter 10	Homework 5 due
14	Water treatment	Chapter 10	
15	Wastewater treatment	Chapter 11	
16	Air pollution	Chapter 12	Homework 6 due
17	Final examination		

University at Albany / Environmental and Sustainable Engineering
Water and Wastewater Treatment
3 Credits
ESE 4XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Water Supply and Pollution Control, Eighth Edition
by Warren Viessman Jr. and Mark Hammer
ISBN-13: 978-0132337175
ISBN-10: 0132337177

COURSE DESCRIPTION / OVERVIEW

This course presents the principles of water treatment, wastewater treatment, water reuse, water quality, and overviews regulations regarding pollution control and drinking water quality. In addition, other topics, such as climate change, alternative water supply development, hydraulics, stormwater treatment techniques, water quality regulations, and filter design are covered, too.

PREREQUISITES
Prerequisite: ESE 3XX Intro to ESE, ESE 3XX Fluid Mechanics

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Become familiar with environmental laws, such as clean water act, safe drinking water act, etc. They will have a deep understanding and appreciation of environmental policies in bettering the environment and human being's life.
- Understand the processes required for conventional water treatment through lectures and field trips.
- Understand the unit operations in treating wastewater through lectures and field trips.
- Be able to apply the learned engineering principles to solve technical programs.
- Be able to design processes for treating water and wastewater based on given characteristics of the water source.
- Be able to develop strategies for reusing water and managing water resource.
- Have better oral and written skills

- Possess enough knowledge in water and wastewater treatment for the fundamental engineering exam

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, exams, and final presentation. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Quiz	5%
Mid-term (2)	20% (each)
Final	30%
Presentation	5%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a

violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Water Regulations and Policies	Chapter 1 & 2	
2	Water and Wastewater Quality Parameters	Chapter 8	Homework 1 due
3	Flocculation and Coagulation	Chapter 10: 7, Chapter 11: 14	
4	Sedimentation	Chapter 10: 8-12	
5	Filtration	Chapter 10: 13-19	Homework 2 due
6	Review and Midterm I		
7	Chemical Review	Chapter 11: 1-6	Homework 3 due
8	Reaction and Reactors	Chapter 11: 7-10	
9	Water Softening- lime soda	Chapter 11: 15-17	
10	Water Softening- ion exchange	Chapter 11: 15-17	Homework 4 due
11	Disinfection/corrosion control	Chapter 11: 21-37	
12	Review and Midterm II		Homework 5 due
13	Biological Reaction Kinetics	Chapter 12: 1-9	
14	Activated Sludge Treatment	Chapter 12: 19-30	
15	Trickling Filter	Chapter 12: 12-18	Homework 6 due
16	Sludge Digestion and Handling	Chapter 13:13-19	
17	Final Examination		

University at Albany / Environmental and Sustainable Engineering
Water Resource Engineering
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Water Resources Engineering, 2nd Edition
By Mays, L. W., John Wiley & Sons, Inc., 2011.
ISBN-13: 978-0470460641
ISBN-10: 0470460644

COURSE DESCRIPTION
Encompassing both analysis and design components, this course provides a comprehensive coverage of water resources engineering. Topics covered include: hydraulic processes, such as pipe flow, open-channel flow and groundwater flow; surface runoff; water distribution, flood control, stormwater control; and sedimentation and erosion hydraulics. In particular, management of water resources through the lens of sustainability will be emphasized.

PREREQUISITE
ESE 3XX Fluid Mechanics

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

- Be familiar with all terminology used in water resource engineering.
- Understand basic principles of surface and groundwater hydrology and use standard techniques to solve problems.
- Be able to use standard techniques to solve flow problems encountered in different environmental matrices.
- Analyze site specific conditions and design a water supply system while keeping green infrastructure techniques in mind.
- Understand urban drainage design issues and design a drainage system using the Rational method.

COURSE WEBSITE AND BLACKBOARD

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES

The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 20% of the final grade.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

Homework	20%
Mid-term (2)	20% for each
Final	35%
Quiz	5%
Attendance	5%

Grading Scale

A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct

Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class

Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as

long as the use is not disruptive or distracting. Also see
http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Water Resources Sustainability	Chapter 2	
2	Hydraulic Processes: Flow and Hydrostatic Forces	Chapter 3	Homework 1 due
3	Hydraulic Processes: Pressurized Pipe Flow	Chapter 4	
4	Hydraulic Processes: Open-Channel Flow	Chapter 5	Homework 2 due
5	Hydraulic Processes: Groundwater Flow	Chapter 6	
6	Review and Midterm I		
7	Surface Runoff	Chapter 8	
8	Reservoir and Stream Flow Routing	Chapter 9	Homework 3 due
9	Probability, Risk, and Uncertainty Analysis	Chapter 10	
10	Water Withdrawals and Uses	Chapter 11	Homework 4 due
11	Water Distribution	Chapter 12	
12	Review and Midterm II		
13	Flood Control	Chapter 14	Homework 5 due
14	Stormwater Control: Storm Sewers and Detention	Chapter 15	
15	Design of Spillways	Chapter 17	Homework 6 due
16	Sedimentation and Erosion Hydraulics	Chapter 18	
17	Final Examination		

University at Albany / Environmental and Sustainable Engineering
Advanced Wastewater Engineering
3 Credits
ESE 4XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK (REQUIRED):
Required Textbook: Wastewater Engineering, Treatment and Reuse, Metcalf & Eddy, 5th Edition, McGRAW HILL, 2014.
ISBN-13: 978-0073401188
ISBN-10: 0073401188

COURSE DESCRIPTION / OVERVIEW

Advanced concepts in the rapidly evolving field of wastewater engineering technological and regulatory changes that have occurred over the last ten years in this discipline are discussed. These discussions center on the new view of wastewater as a source of energy, nutrients and potable water; more stringent discharge requirements related to nitrogen and phosphorus; and enhanced understanding of the fundamental microbiology and physiology of the microorganisms responsible for the removal of nitrogen and phosphorus and other constituents. In addition, treatment of sludge and management of biosolids will be introduced.

PREREQUISITES
Prerequisite: ESE 4XX Water and Wastewater Treatment

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course students will:

- Be familiar with regulatory requirement regarding nitrogen and phosphorous removal from wastewater.
- Understand the theory behind biological processes for nitrogen and phosphorous removal, membrane techniques for water reuse and anaerobic digestion of high strength wastewater
- Be able to design processes for treating wastewater for meeting regulatory requirements.
- Be able to choose and design processes for reusing water considering cost and carbon footprint as factors.

- Be able to design processes for treating and disposing sludge while considering sludge as a source of energy.
- Possess better oral and written skills

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:
The accomplishment of course objectives will be assessed by evaluating students' homework, exams, and final report/presentation. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Mid-term	20%
Final	30%
Report/Presentation	30%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Introduction/ chemical unit processes	Chapter 6	
2	Bacteria growth	Chapter 7-4	Homework 1 due
3	Bioenergetics	Chapter 7-4	
4	Microbial growth kinetics (1)	Chapter 7-5	Homework 2 due
5	Microbial growth kinetics (2)	Chapter 7-5	
6	Modeling suspended growth	Chapter 7-6	Homework 3 due
7	Review and Midterm I		
8	Biological nitrification/denitrification	Chapter 7-9, 7-10, 8-5	
9	Biological phosphorous removal	Chapter 7-11, 8-6	Homework 4 due
10	Anaerobic treatment processes	Chapter 10-1, 10-2	
11	Anaerobic suspended growth	Chapter 10-3, 4	
12	Depth filtration	Chapter 11-4	Homework 5 due
13	Membrane filtration	Chapter 11-6	
14	Adsorption	Chapter 11-7	
15	Ion exchange	Chapter 11-9	Homework 6 due
16	Final presentation		
17	Final examination		

University at Albany / Environmental and Sustainable Engineering
Air Pollution Control
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Air Pollution Control, A Design Approach, Fourth Edition
By C. David Cooper, F. C. Alley
ISBN-13: 978-1577666783
ISBN-10: 157766678X

COURSE DESCRIPTION
This course provides a detailed coverage of two key components: information on air pollutants and design training on how to control air pollution. Air pollutants, such as particulate matter, volatile organic compounds, sulfur dioxide, nitrogen oxides will be presented in detail. The corresponding control technologies are then introduced to remove these contaminants from air. In addition, control of carbon dioxide emission is included as well. All of these discussions reflect the most recent information on U.S. air quality trends and standards.

PREREQUISITE
A ATM 210/210Z Atmospheric Structure, Thermodynamics, and Circulation

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

1) Be familiar with legal framework related to air pollution control.
2) Be able to identify the right technology for controlling different air pollutants based upon understanding of characteristics of air pollutants.
3) Be able to design suitable equipment for removing various pollutants out of air.
4) Be able to understand the theory behind and use different models properly for point and non-point sources.
5) Be able to address indoor air quality control issues by applying mass balance models.

COURSE WEBSITE AND BLACKBOARD
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 20% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	20%
Mid-term (2)	20% each
Final	30%
Quiz	5%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX

The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Introduction	Chapter 1	
2	Particulate Matter	Chapter 3	Homework 1 due
3	Cyclones, fabric filters	Chapter 4, 6	
4	Electrostatic precipitators	Chapter 5	Homework 2 due
5	Review and Midterm I		
6	Properties of Gases and Vapors	Chapter 10	Homework 3 due
7	VOC Incinerators	Chapter 11	
8	Gas adsorption/absorption	Chapter 12, 13	
9	Biological control of VOCs and odors	Chapter 14	Homework 4 due
10	Control of sulfur dioxides	Chapter 15	
11	Review and Midterm II		
12	Control of nitrogen oxides	Chapter 16	
13	Air pollution and meteorology	Chapter 19	Homework 5 due
14	Atmospheric dispersion modeling	Chapter 20	
15	Indoor air quality and control	Chapter 21	Homework 6 due
16	Control of carbon dioxide		
17	Final Examination		

University at Albany / Environmental and Sustainable Engineering
Air Quality Modeling
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Hazardous waste management, 2nd edition
By Michael D. LaGrega, Phillip L. Buckingham, Jeffrey C. Evans
ISBN-13: 978-1577666936
ISBN-10: 1577666933

COURSE DESCRIPTION
Air quality is a major concern in many countries, and the governments are undertaking initiatives to improve it. The primary tool for evaluating these initiatives is air quality modeling. This course is designed for the senior undergraduate students to learn and practice air quality modeling in the field of environmental science. The course will provide the students with the fundamental knowledge of air pollution dispersion, meso-scale meteorology and three-dimensional Eulerian grid modeling. Theory behind commonly known air quality models, as well as their applications will be covered during the course. Moreover, the students will have opportunities to carry out hands-on exercises to discover potential applications of these models, enhancing their understanding of the course materials.

PREREQUISITE
A ATM 210/210Z Atmospheric Structure, Thermodynamics, and Circulation

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

Understand the fundamentals of air quality modeling 15% 2 Describe the operational principles of air quality modeling and its applications 15% 3 Apply the knowledge of modeling to understand the sources of air pollution and the meteorological conditions that trigger air pollution 20% 4 Apply the knowledge in operating the state-of-the-art air quality models and discover potential applications of these air quality models

1) Be able to articulate the history and the legal framework surrounding hazardous waste issues.
2) Be able to evaluate regulatory compliance requirements for a specific industry.
3) Know how to characterize different hazardous wastes in terms of chemistry and toxicology.
4) Be able to describe various types of hazardous wastes, their impact on the environment, and respective remediation technologies spanning across physical, chemical and biological treatment processes.
5) Understand how to conduct site remediation with respect to sampling, analysis and modeling
6) Understand contemporary methods of hazardous waste mitigation and remediation including waste minimization, pollution prevention, reuse, and recycling

COURSE WEBSITE AND BLACKBOARD

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES

The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, report, presentation and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Mid-term	20%
Final	30%
Quiz	5%
Report/presentation	25%
Attendance	5%

Grading Scale

A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given

only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic

Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Legal framework of hazardous wastes	Part I, 1, 2	
2	Fate and transport of contaminants	Part I, 3, 4	Homework 1 due
3	Toxicology	Part I, 5	
4	Environmental audits	Part II, 6	Homework 2 due
5	Pollution prevention	Part II, 7	
6	Facility development and operations	Part II, 8	
7	Treatment: physicochemical processes	Part III, 9	Homework 3 due
8	Treatment: biological	Part III, 10	
9	Stabilization and solidification	Part III, 11	
10	Review and Midterm I		
11	Thermal methods	Part III, 12	
12	Land disposal	Part III, 13	Homework 4 due
13	Site remediation: quantitative risk assessment	Part IV, 14	
14	Site remediation: site and subsuface characterization	Part IV, 15	
15	Site remediation: remedial technologies	Part IV, 16	Homework 5 due
16	Final presentation		
17	Final examination		

University at Albany / Environmental and Sustainable Engineering
Energy Engineering
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Energy Systems Engineering: Evaluation and Implementation. McGraw Hill, 3rd Edition.
By Francis M. Vanek, Louis D. Albright, and Largus T. Angenent.
ISBN-13: 978-1259585098
ISBN-10: 1259585093

COURSE DESCRIPTION
This course provides a comprehensive coverage of all of the major energy technologies, such as fossil, nuclear, and renewable energy. Topics including how these technologies work, how they are quantitatively evaluated, how much they cost, and their impact on the natural environment will be discussed thoroughly.

PREREQUISIT: Junior or Senior Standing or consent of instructor

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

1) Be able to understand the diversity of energy technologies, the disadvantages and benefits of each.
2) Be able to conduct cost analysis and compare different technologies in terms of economics.
3) Be able to calculate carbon footprint of each technology considering the whole process from raw materials to the final products.
4) Be able to come up with his or her own solution addressing global energy sustainability.
5) Be able to provide a blueprint of future energy market based on a given location or region considering its geographical characteristics.
6) Have improved oral, written communication and critical thinking skills.

7) Be proficient for performing energy analysis for built environment and the transportation sector.

COURSE WEBSITE AND BLACKBOARD

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES

The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, paper, presentation and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Mid-term	20%
Final	30%
Quiz	5%
Paper/presentation	25%
Attendance	5%

Grading Scale

A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct

Student and staff/faculty interactions in the classroom and other on-campus environments are expected to

be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Legal framework of hazardous wastes	Part I, 1, 2	
2	Fate and transport of contaminants	Part I, 3, 4	Homework 1 due
3	Toxicology	Part I, 5	
4	Environmental audits	Part II, 6	Homework 2 due
5	Pollution prevention	Part II, 7	
6	Facility development and operations	Part II, 8	
7	Treatment: physicochemical processes	Part III, 9	Homework 3 due
8	Treatment: biological	Part III, 10	
9	Stabilization and solidification	Part III, 11	
10	Review and Midterm I		
11	Thermal methods	Part III, 12	
12	Land disposal	Part III, 13	Homework 4 due
13	Site remediation: quantitative risk assessment	Part IV, 14	
14	Site remediation: site and subsuface characterization	Part IV, 15	
15	Site remediation: remedial technologies	Part IV, 16	Homework 5 due
16	Final presentation		
17	Final examination		

University at Albany / Environmental and Sustainable Engineering
Groundwater Hydrology
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Groundwater Hydrology, 3rd Edition
David Keith Todd, Larry W. Mays
ISBN: 978-0-471-05937-0
ISBN-10: 0471059374

COURSE DESCRIPTION
This course provides a comprehensive coverage of fundamental principles governing subsurface flow and transport, methods and problems encountered in managing groundwater resources. Specifically, this course will address concerns and competition for water supplies, contamination of groundwater, and enhanced regulation of water resources. Topics covered include: Darcy equation, the aquifer flow equation, storage properties, regional circulation, unsaturated flow, recharge, well hydraulics, numerical models, groundwater quality, contaminant transport processes, etc.

PREREQUISITE
ESE 3XX Water Resource Engineering

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

- Be familiar with the language used commonly in groundwater hydrology.
- Be able to apply materials in the textbook to realistic daily situations.
- Be able to describe the occurrence and movement of groundwater in its subsurface setting.
- Understand the chemistry of groundwater in its natural and contaminated conditions.
- Understand geophysical techniques, both surface and subsurface, for investigating underground availability of water.
- Understand the technique of artificial recharge of groundwater as a conservation and storage procedure.

- Be able to use standard techniques to solve flow problems encountered in different environmental matrices.
- Be able to use MODFLOW for modeling groundwater flow and managing groundwater resources on a basin-wide basis for known or anticipated inputs and outputs.

COURSE WEBSITE AND BLACKBOARD
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, project and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Three exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Mid-term (2)	20% for each
Final	25%
Quiz	5%
Project	10%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to

be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations
Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Introduction	Chapter 1	
2	Occurance of groundwater	Chapter 2	Homework 1 due
3	Groundwater movement	Chapter 3	
4	Groundwater and well hydraulics	Chapter 4	Homework 2 due
5	Water wells	Chapter 5	
6	Review and Midterm I		
7	Groundwater level and environmental influences	Chapter 6	Homework 3 due
8	Quality of groundwater	Chapter 7	
9	Pollution of groundwater	Chapter 8	Homework 4 due
10	Groundwater flow modeling	Chapter 9	
11	Management of groundwater	Chapter 10	
12	Review and Midterm II		
13	Surface investigations of groundwater	Chapter 11	Homework 5 due
14	Subsurface investigations of groundwater	Chapter 12	
15	Artificial recharge of groundwater	Chapter 13	Homework 6 due
16	Saline water intrusion in aquifers	Chapter 14	
17	Final examination		Project report due

University at Albany / Environmental and Sustainable Engineering
Hazardous waste management
3 Credits
ESE 4XX
Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit course, it will meet either 3 times per week for one hour each or twice per week for 90 minutes, or in two one-hour 'lecture' period with an accompanying 3-hour lab meeting once a week.

TEXTBOOK:
Required Textbook: Hazardous waste management, 2nd edition
By Michael D. LaGrega, Phillip L. Buckingham, Jeffrey C. Evans
ISBN-13: 978-1577666936
ISBN-10: 1577666933

COURSE DESCRIPTION
This course provides a comprehensive coverage of the sources and generation of hazardous wastes, the scientific and engineering principles necessary to eliminate the threats they pose to people and the environment, the laws regulating their disposal, and the best or most cost-effective methods for dealing with them.

PREREQUISITE
ESE 3XX Fluid Mechanics, ESE 3XX Introduction to Environmental Engineering

COREQUISITE
None

LEARNING OBJECTIVES / OUTCOMES
At the completion of the course students will:

1) Be able to articulate the history and the legal framework surrounding hazardous waste issues.
2) Be able to evaluate regulatory compliance requirements for a specific industry.
3) Know how to characterize different hazardous wastes in terms of chemistry and toxicology.
4) Be able to describe various types of hazardous wastes, their impact on the environment, and respective remediation technologies spanning across physical, chemical and biological treatment processes.
5) Understand how to conduct site remediation with respect to sampling, analysis and modeling
6) Understand contemporary methods of hazardous waste mitigation and remediation including waste minimization, pollution prevention, reuse, and recycling

COURSE WEBSITE AND BLACKBOARD
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES
The accomplishment of course objectives will be assessed by evaluating students' homework, quizzes, report, presentation and exams. These evaluations will be conducted throughout the whole semester in order to adjust the depth of teaching materials and pace of delivery to maximize students' learning outcomes.

Exams: Two exams will be given.

Assignments: Assignments are to be completed outside of class. They will be graded on a 10-point scale and will be totaled together to account for 15% of the final grade.

Grading
A final grade will be determined as a weighted average of these scores using the following weights:

Homework	15%
Mid-term	20%
Final	30%
Quiz	5%
Report/presentation	25%
Attendance	5%

Grading Scale
A: 100-95 points A-: 94-90 points
B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class

Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX

The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials

will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Readings	Note
1	Legal framework of hazardous wastes	Part I, 1, 2	
2	Fate and transport of contaminants	Part I, 3, 4	Homework 1 due
3	Toxicology	Part I, 5	
4	Environmental audits	Part II, 6	Homework 2 due
5	Pollution prevention	Part II, 7	
6	Facility development and operations	Part II, 8	
7	Treatment: physicochemical processes	Part III, 9	Homework 3 due
8	Treatment: biological	Part III, 10	
9	Stabilization and solidification	Part III, 11	
10	Review and Midterm I		
11	Thermal methods	Part III, 12	
12	Land disposal	Part III, 13	Homework 4 due
13	Site remediation: quantitative risk assessment	Part IV, 14	
14	Site remediation: site and subsuface characterization	Part IV, 15	
15	Site remediation: remedial technologies	Part IV, 16	Homework 5 due
16	Final presentation		
17	Final examination		

University at Albany / Environmental and Sustainable Engineering
Senior Capstone Design
3 Credits
ESE 4XX

Meeting Time: TBD
Location TBD

Instructor	
Instructor Title	
Office Location	
Office hours	
E-mail Address	

This course is new and has yet to be scheduled. As a 3-credit senior design course, students will meet with the advisor one time for one hour per week. Besides the formal lectures, students will work on themselves and with their teammates to finish an assigned capstone project.

TEXTBOOK (REQUIRED): None.

COURSE DESCRIPTION / OVERVIEW
Teams of students conduct preliminary and final design of real-world Environmental Engineering projects. Students will be able to hone their design skills based upon knowledge, tools and skills learned from other courses. Progress reports and presentations from all team members are required for this course.

PREREQUISITES
Senior standing OR instructor consent

COREQUISITES
None

LEARNING OBJECTIVES / OUTCOMES:
At the completion of the course, students will be able to:

1. Participate in and collaborate with other students on an authentic design project,
2. Function well in multidisciplinary teams,
3. Understand how to apply knowledge and tools learned from other courses to address real-world problems,
4. Understand steps involved in finishing Engineering design problems,
5. Improve their written, oral, and visual/graphical communication skills, project management and team management skills and organization skills

COURSE WEBSITE AND BLACKBOARD:
Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance is essential and required.

ASSESSMENT AND POLICIES:

The accomplishment of course objectives will be assessed by evaluating students' class attendance and participation, written progress report, progress report presentation, final written report, and final presentation. These evaluations will be conducted throughout the whole semester in order to ensure that all design teams will finish their projects on time.

Exams: None.

Design proposal

At the beginning of the semester, each team will select a project from a list provided by local industries. These industries will serve as the clients. Once a project is adopted, students within one team will work together to develop a solution toward the target problem. This development involves sessions of brainstorming where all team members participate and research and investigation sessions where individual team members work on specific assignment. Once all details are in place, the team will work collaboratively to prepare a proposal. This proposal should include: (1) problem statement; (2) literature review of relevant works; and (3) alternative and available solutions. Contribution from each team member should be labeled clearly in the proposal.

Proposal presentation

Each team has 17 minutes to present its proposal and has three minutes for addressing questions from other teams, the client and the project principal (the course instructor). Each presentation will be evaluated by the three parties: other teams, the client and the course instructor in terms of timing, content, clarity, and visual effect.

Final written report

Each team needs submit its final report by the deadline. Reported submitted after the deadline will not be accepted. The final report should focus on the target solution and illustrate in detail how it will work. The overall design should consider the triple bottom line: environment, economy and society. In addition, all projects must describe how sustainability will be maintained and achieved through the final design. Contribution from each team member should be labeled clearly.

Final presentation

Each team will have 20 minutes to present the final design and five minutes to answer questions from the audience. Presentations will be evaluated similarly as the proposal presentation.

Attendance/participation

This course will have weekly lectures, weekly team meeting with the instructor and weekly meeting among the team members. Active participation in discussion is expected from everyone. Every Friday, each team member should submit his or her timesheet to the team captain who will then submit all timesheets to the instructor.

Grading

A final grade will be determined as a weighted average of these scores using the following weights:

Design proposal	20%
Proposal presentation	15%
Final written report	30%
Final presentation	20%
Attendance/participation	15%

Grading Scale

A: 100-95 points A-: 94-90 points

B+: 89-87 points B: 84-86 points B-: 80-83 points
C+: 79-76 points C: 75-70 points
D: 69-60 points
E: 59 points and below

The instructor may choose to re-curve the distribution, in favor of students.

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned."

Student Conduct
Student and staff/faculty interactions in the classroom and other on-campus environments are expected to be professional and cordial. Disruptive behavior in the classroom may be treated by the instructor as a violation of the U Albany Student Code of Conduct, and subject to a formal Student Conduct Referral.

Attendance/Lateness/Use of Computers in class
Students are expected to *attend every class and to arrive on time*. Please DO NOT disrupt the class or labs by entering late or leaving early without instructor approval. Attendance will be taken at every class meeting. Each unexcused absence (not approved by instructor prior to class) will result in a 2-point deduction from your class participation grade. Computers may be used during class for note taking as long as the use is not disruptive or distracting. Also see http://www.albany.edu/health_center/medicalexcuse.shtml.

Responsible Computing
Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (http://www.albany.edu/its/policies_responsible_use_of_IT.htm). Students will be expected to apply the policies discussed in this document to all electronic communications in the course.

Students With Disabilities
Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: http://www.albany.edu/disability/docs/RAP.doc. This website can be reached by following the link under "Reasonable Accommodation Policy" at the following webpage http://www.albany.edu/disability/faculty-staff.shtml.

Title IX
The University at Albany recognizes that an in order to maintain a healthy, safe, and vibrant living and learning community, it must continue to foster an environment free from gender inequality and sexual violence. In furthering its commitment to that cause, the University has appointed a full time administrator to ensure our realization of this important agenda. Further information can be found at the following U Albany url: http://www.albany.edu/titleIX/indexmain.php

Academic Honesty and Overall Regulations

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the Undergraduate Bulletin (http://www.albany.edu/undergraduate_bulletin/regulations.html). The standards described in this document will be applied in this course relating to academic honesty and overall regulations.

Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will earn a zero grade for that assignment. If there is more than one copying incident, the student will be graded an F for the class. As per college policy, cheating activity will be reported to the college administration.

COURSE OUTLINE AND READINGS:
The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific homework and lab assignments and materials will be provided in Blackboard. Students are expected to have read the listed material before it is covered in class. There will be additional readings related to certain course topics.

Week	Topics	Assignment due
1	Introduction and project assignment	Timesheet
2	Writing winning proposals and getting projects	Timesheet
3	People management skills	Timesheet
4	Time management skills	Timesheet
5	Engineering ethics	Timesheet
6	Engineering cost analysis	Timesheet
7	Professional presentation skills	Timesheet
8	Communication skills	**Proposal due**
9	**Proposal presentation**	Timesheet
10	Engineering risk analysis	Timesheet
11	Engineering decision-making	Timesheet
12	Sustainability evaluation	Timesheet
13	Professional licensure	Timesheet
14	Life-long learning	Timesheet
15	Resume workshop	Timesheet
16	Networking	**Final report due**
17	**Final presentation**	Timesheet

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 5

Job Announcement for Faculty

University at Albany - Environmental and Sustainable Engineering, Open Rank Faculty (3 Openings)

Thank you for considering University at Albany in your search.

Category:	Faculty
Department:	College of Engineering and Applied Sciences
Locations:	Albany, NY
Posted:	Oct 02, '17
Type:	Full-time
Ref. No.:	P17-48213

Share

About University at Albany:

Established in 1844 and designated a University Center of the State University of New York in 1962, the University at Albany's broad mission of excellence in undergraduate and graduate education, research and public service engages a diverse student body of more than 17,300 students in nine schools and colleges across three campuses.

Located in Albany, New York, New York State's capital, the University is convenient to Boston, New York City and the Adirondacks.

Job Description:

The College of Engineering and Applied Sciences of University at Albany seeks applicants for open rank (Assistant, Associate, or Full Professor) tenure-track faculty positions beginning Fall 2018 for its Environmental and Sustainable Engineering Department.

The University at Albany, SUNY, is building a research-intensive college of engineering in the tradition of the nation's leading public research institutions, developing academic programs and research thrusts for which we are particularly well positioned by leveraging our considerable existing strengths. The College is in an exciting period of rapid expansion, as this year environmental engineering will join our long-standing programs in computer science, with programs in electrical and computer engineering recently launched and growing rapidly. This is just the beginning; programs in several other engineering disciplines are currently in development. We expect to create six or more new engineering programs in the College by 2021. All programs will offer fully accredited B.S., M.S., and Ph.D. degrees. Our undergraduate programs, in particular, will prepare students for careers not just in engineering and other applied sciences, but also for careers and/or postgraduate studies in many other fields, including law, medicine, finance, management, and more.

Requirements:

- Ph.D. in Environmental Engineering, or a closely related discipline, from a college or university accredited by the U.S. Department of Education or an internationally recognized accrediting organization, or anticipate completion by August 2018. Areas of particular professional interest for these positions include, but are not limited to, water and wastewater treatment and reuse, air quality and pollution prevention, solid waste disposal,

hazardous waste remediation, renewable materials, sustainable design, food-energy-water nexus, and water resource engineering.

- Applicants must be willing to participate actively in interdisciplinary research.
- Applicants must be willing to teach courses in Environmental Engineering at the undergraduate and graduate levels.
- Applicants must be able to work with a culturally diverse population.
- Successful applicants will present a record of research accomplishments commensurate with the rank being sought.
- Senior applicants should demonstrate active participation in professional engineering organizations.
- Applicants should be committed to teaching, research, and service in an interdisciplinary environment, and will be encouraged to participate in curriculum development at both the undergraduate and graduate levels.

Additional Information:

Professional Rank and Salary Range: Full, Associate or Assistant Professor - Competitive and commensurate with qualifications and experience

The Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act, or Clery Act, mandates that all Title IV institutions, without exception, prepare, publish and distribute an Annual Security Report. This report consists of two basic parts: disclosure of the University's crime statistics for the past three years; and disclosures regarding the University's current campus security policies. The University at Albany's Annual Security Report is available in portable document format [PDF] by clicking this link http://police.albany.edu/ASR.shtml

Pursuant to Executive Order 161, no State entity, as defined by the Executive Order, is permitted to ask, or mandate, in any form, that an applicant for employment provide his or her current compensation, or any prior compensation history, until such time as the applicant is extended a conditional offer of employment with compensation. If such information has been requested from you before such time, please contact the Governor's Office of Employee Relations at (518) 474-6988 or via email at info@goer.ny.gov.

THE UNIVERSITY AT ALBANY IS AN EO/AA/IRCA/ADA EMPLOYER

Please apply online via http://albany.interviewexchange.com/candapply.jsp?JOBID=89832

For additional information on the College and its departments, please see http://www.albany.edu/ceas/

Application Instructions:

Applicants MUST submit the following documents:

- Curriculum vitae (with publications)
- Cover letter stating all the required minimum qualifications and any of the applicable preferred qualifications
- Research statement
- Teaching statement
- Applicants will be asked to provide names and contact information for at least three references.

Special Note: Once applications have been initially screened, candidates will receive notification of how to submit three letters of reference through Interview Exchange.

Note: After submitting your CV, the subsequent pages give you instructions for uploading additional documents (i.e. cover letter etc.).

See the FAQ for using our online system. Please **contact us** if you need assistance applying through this website.

Returning Applicants - Login to your UAlbany Careers Account to check your completed application.

This search will remain open until filled.

Date to be filled: Fall 2018

Adjunct Lecturer, Environmental and Sustainable Engineering

Applicants must have a MS in Civil Engineering, Mechanical Engineering, or a closely related discipline, from a college or university accredited by the U.S. Department of Education or an internationally recognized accrediting organization, or anticipate completion by August 2018. A Ph.D. degree in the same discipline is preferred. The ideal candidate should have experience in teaching engineering courses at the undergraduate level.

UAB 234
1400 Washington Avenue, Albany, NY 12222
PH: 518-437-4979
yliang3@albany.edu www.albany.edu/ceas

University at Albany
New Program Proposal
BS in Environmental and Sustainable Engineering

Appendix 6

Articulation Agreements

Dutchess Community College

Hudson Valley Community College

April 4, 2018

Dr. Yanna Liang
Environmental and Sustainable Engineering
Department Chair
University at Albany
1400 Washington Avenue
Albany, NY 12222

Dear Dr. Liang

Dutchess Community College is pleased to support the B.S. Degree Program in Environmental and Sustainable Engineering at the University at Albany.

Academic programs at the University at Albany provide students at Dutchess Community College a rigorous academic experience following the completion of their degree with us as they pursue a baccalaureate degree. Therefore, we have attached to this letter a course equivalency table for the University at Albany that provides transfer course credits applied to the Environmental and Sustainable Engineering major, general education, and elective course requirements at the University at Albany.

Dutchess Community College is delighted to continue our longstanding, close relationship with the University at Albany and we are proud to offer each student the opportunity to earn both an Associate's Degree and Baccalaureate Degree within the State University of New York System.

Sincerely,

Mark Courtney
Program Chair
Engineering Science A.S

SUNY TRANSFER COURSE EQUIVALENCY TABLE

Dutchess Community College Engineering Science A.S.					University at Albany Environmental and Sustainable Engineering B.S.				
Course #	**Course Title**	**SUNY Gen Ed**	**Major or Pathway**	**Credits Granted**	**Course #**	**Equivalent Course Title**	**SUNY Gen Ed**	**Major or Pathway**	**Credits Accepted**
BHS 103	Social Problems in Today's World	X		3	ASOC 180	Social Problems	X		3
BIO 105	General Biology I (Suggested Technical Elective) (1)	X	X	4	ABIO 131/202	General Biology/Lab	X	X	4
BIO 106	General Biology II (Suggested Advanced Technical Elective) (1)	X	X	4	ABIO 130/201	Biology I/Lab	X	X	4
CHE 121	General Chemistry I	X	X	4	ACHM 120/124	General Chemistry I/Lab	X	X	4
CHE 122	General Chemistry II	X	X	4	ACHM 121/125	General Chemistry II/Lab	X	X	4
ENG 101	English Composition	X		3	AENG 100Z	Introduction to Analytical Writing	X		3
ENG 102	English Composition II	X		3	AENG 010Z	English Elective	X		3
ENT 131	Technical Drawing			1	ICEN 010	Computer/Electrical Engineering Elective			1
ENR 100	Engineering Technology Introductory Seminar			1	ICEN 010	Computer/Electrical Engineering Elective			1
ENR 101	Introduction to Engineering		X	2	IESE 100	Intro to Engineering		X	2
ENR 102	Computer Programming for Engineers		X	3	ICEN 200	Programming for Engineers		X	3
ENR 208	Engineering Statics		X	3	IESE 2XX	Statics		X	3
ENR 209	Engineering Dynamics			3	IECE 010	Electrical and Computer Engineering			3
MAT 221	Calculus I	X	X	4	AMAT 112	Calculus I	X	X	4
MAT 222	Calculus II	X	X	4	AMAT 113	Calculus II	X	X	4
MAT 223	Calculus III	X	X	4	AMAT 214	Calculus of Several Variables	X	X	4
MAT 224	Differential Equations	X	X	4	AMAT 311	Ordinary Differential Equations	X	X	4
PHY 151	Calculus-Based Physics I	X	X	4	APHY 140/145	Physics I:Mechanics/Lab	X	X	4
PHY 152	Calculus-Based Physics II	X	X	4	APHY 150/155	Physics II: Electromagnetism/Lab	X	X	4
PHY 251	Engineering Physics III	X		4	APHY 240	Physics III: Structure of Matter/Lab	X		4
WFE 101	Lifetime Wellness and Fitness			3	DPEC 030	Physical Education Elective			3
	American History	X		3		History Elective	X		3
					Total Credits Eligible for Transfer				**72**
					Additional Required and Elective Courses for the Major at UAlbany				
						Challenges of the 21st Century	X	X	3
					AATM 210	Atmospheric Structure		X	3
					AENV 250	Sustainable Development		X	3
					AMAT 370	Probability and Statistics		X	3
					HEHS 560	Sustainability, Green Design and Public Health		X	3
					HSPH 321	Global Environmental Issues		X	3
					ICEN/ICSI 210	Discrete Structures		X	4
					IESE 2XX	Strength of Materials		X	3
					IESE 3XX	Fluid Mechanics		X	3
					IESE 3XX	Introduction to Environmental Engineering w/Lab		X	3
					IESE 4XX	Air Pollution Control		X	3
					IESE 4XX	Water Resource Engineering		X	3
					IESE 4XX	Hazardous Waste Management		X	3
					IESE 4XX	Water/Wastewater Treatment		X	3
					IESE 4XX	Advanced Wastewater Engineering		X	3
					IESE 4XX	Senior Capstone Design		X	3
					IESE 4XX	Energy Engineering		X	3
					IESE 4XX	Air Quality Modeling		X	3
						ESE Electives (2)		X	9
	Total credits required for degree completion at Dutchess Community College			**72**		Total Credits required at UAlbany			**64**
						Total Credits Applied to Program			**72**
						Total Credits Required for Degree			**136**

(1)This course is suggested because it meets a requirement for the major at UAlbany upon transfer.
(2)ESE Electives: ESE Electives: AATM 200; AATM 301; AATM 304; AATM 307; AENV 315; AENV 350; AUSP 452; AGOG 496; HSPH/HEHS 323; HEHS 520; or IESE 4XX

A transfer student admitted to the University at Albany who has completed his/her A.A. or A.S. degree will be given credit for meeting SUNY's General Education requirements.

May 4, 2018

Dr. Yanna Liang
Environmental and Sustainable Engineering Department Chair
University at Albany
1400 Washington Avenue
Albany, NY 12222

Dear Dr. Liang,

Hudson Valley Community College (HVCC) is pleased to support the B.S. in Environmental and Sustainable Engineering at the University at Albany.

Academic programs at the University at Albany provide HVCC graduates with a rigorous academic experience, as they pursue their baccalaureate degree. Therefore, we have attached to this letter a course equivalency table, which provides transfer course credits from the A.S. in Engineering Science degree program at HVCC to be applied to the B.S. in Environmental and Sustainable Engineering degree program major, general education, and elective requirements at the University at Albany.

HVCC is delighted to continue our longstanding, close relationship with the University at Albany, and we are proud to offer our students the opportunity to earn both associate and baccalaureate degrees within the State University of New York (SUNY) system.

Warm regards,

MaryAnn Janosik, Ph.D.
Interim Vice President for Academic Affairs
Hudson Valley Community College (HVCC)

Attachment: Transfer Course Equivalency Table

SUNY TRANSFER COURSE EQUIVALENCY TABLE

Hudson Valley Community College Engineering Science A.S.					University at Albany Environmental and Sustainable Engineering B.S.				
Course #	**Course Title**	**SUNY Gen Ed**	**Major or Pathway**	**Credits Granted**	**Course #**	**Equivalent Course Title**	**SUNY Gen Ed**	**Major or Pathway**	**Credits Accepted**
BIOL 150 BIOL 190	Biology I Biology I (Suggested Engineering Elective) (1)	X	X	4	ABIO 130/201	General Biology: Molecular & Cell Biology/Lab	X	X	4
CHEM 110 CHEM 120	General Chemistry I Chemistry I	X	X	4	ACHM 120/124	General Chemistry I/Lab	X	X	4
CHEM 111 CHEM 121	General Chemistry II Chemistry II (Suggested Restricted Elective) (1)	X	X	4	ACHM 121/125	General Chemistry II/Lab	X	X	4
ENGL 101	English Composition I	X		3	AENG 100Z	Introduction to Analytical Writing	X		3
ENGL 102	English Composition II	X		3	AENG 010	English Elective	X		3
ENGR 110	Engineering Tools			3	ICEN 150	Intro to Engineering Analysis			3
ENGR 120	Intro. To Engineering Design		X	3	IESE/ICEN 110	Introduction to Engineering		X	3
ENGR 211	Engineering Statics		X	4	IESE 2XX	Statics		X	4
ENGR 218	Strengthen of Materials (Suggested Engineering Elective) (1)		X	4	IESE 2XX	Strength of Materials		X	4
MATH 180	Calculus I	X	X	4	AMAT 112	Calculus I	X	X	4
MATH 190	Calculus II	X	X	4	AMAT 113	Calculus II	X	X	4
MATH 210	Calculus III	X	X	4	AMAT 214	Calculus of Several Variables	X	X	4
MATH 220	Calculus IV: Differential Equations	X	X	4	AMAT 311	Ordinary Differential Equations	X	X	4
PHYS 150	Physics I	X	X	4	APHY 140/145	Physics I: Mechanics/Lab	X	X	4
PHYS 151	Physics II	X	X	4	APHY 150/155	Physics II: Electromagnetism/Lab	X	X	4
PHYS 250	Physics III	X		4	APHY 250	Physics IV: Waves	X		4
	Engineering Electives (2)			4		Engineering Elective			4
	SUNY Gen. Ed. Electives (3)	X		6		SUNY Gen. Ed. Electives	X		6
FORM 102	College Forum (4)			1		No Credit Given			0
					Total Credits Eligible for Transfer				**69**
					Additional Required and Elective Courses for the Major at UAlbany				
						Challenges of the 21st Century	X	X	3
					AATM 210	Atmospheric Structure		X	3
					ABIO 131/202	General Biology/Lab	X	X	4
					AENV 250	Sustainable Development		X	3
					AMAT 370	Probability and Statistics		X	3
					HEHS 560	Sustainability, Green Design and Public Health		X	3
					HSPH 321	Global Environmental Issues		X	3
					ICEN 200 or ICEN/ICSI 201	Introduction to Programming or Introduction to Computer Science		X	4
					ICEN/ICSI 210	Discrete Structures		X	4
					IESE 3XX	Fluid Mechanics		X	3
					IESE 3XX	Introduction to Environmental Engineering w/Lab		X	3
					IESE 4XX	Water Resource Engineering		X	3
					IESE 4XX	Hazardous Waste Management		X	3
					IESE 4XX	Water/Wastewater Treatment		X	3
					IESE 4XX	Air Pollution Control		X	3
					IESE 4XX	Senior Capstone Design		X	3
					IESE 4XX	Energy Engineering		X	3
					IESE 4XX	Advanced Wastewater Engineering		X	3
					IESE 4XX	Air Quality Modeling		X	3
						ESE Electives (5)		X	9
	Total credits required for degree completion at ENTER NAME			**70**				Total Credits required at UAlbany	**69**
								Total Credits Applied to Program	**69**
								Total Credits Required for Degree	**138**

(1)This course is suggested because it meets a requirement for the major at UAlbany upon transfer.
(2)Students must select one Engineering Elective from ENGR 215, ENGR 218, ENGR 220, ENGR 223, or ENGR 225.
(3)Students are required to take courses from two different SUNY Gen. Ed. Areas: AH, WC, OC, AR, HU, SS, or FL.
(4)The University at Albany does not currently accept transfer credit for College Forum courses.
(5)ESE Electives: AATM 200; AATM 301; AATM 304; AATM 307; AENV 315; AENV 350; AUSP 452; AGOG 496; HSPH/HEHS 323; HEHS 520; or IESE 4XX.

A transfer student admitted to the University at Albany who has completed his/her A.A. or A.S. degree will be given credit for meeting SUNY's General Education requirements.

Students at HVCC may speak with their advisor to determine if they can take courses from the below list to meet additional requirements prior to transfer to the University at Albany.

HVCC Course	University at Albany Equivalency
BIOL 151 or BIOL 191	ABIO 131/202
CSCI 110	ICSI 201
MATH 183	ICSI 210