ESF State University of New York College of Environmental Science and Forestry

Academic Affairs Committee

Course Proposal Form

- This course proposal form should be completed when introducing a new course or revising an existing course.
- Download and complete the form on your computer, do not fill out in a web browser.
- All proposals must first go through your departmental curriculum committee process before being submitted to the Academic Affairs Committee (AAC). Be sure to plan for departmental and AAC schedules and deadlines.
- The proposal will be reviewed by the AAC or, in the case of a minor revision, approved administratively by the Associate Provost for Instruction.
- If you are proposing a new course, or renumbering an existing course, please check with the Registrar regarding use/reuse of the number.
- If you are proposing a SUNY general education course, please contact curriculum@esf.edu for more information and guidance. General education courses require additional paperwork.

Proposer name: Yaqi You

Contact email: yyou@esf.edu

Contact phone: (315) 470-6765

Department: Environmental Resources Engineering

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1. Course Information

1.1. Type of Proposal: New ☐ Revision ☒ Replacement ☐

1.2. Course Prefix, Number & Title: ERE 580 Fate and Transport of Contaminants

1.3. If this course is replacing a current ESF course, please provide the number and name of the course to be deactivated and removed, if this proposal is approved:

NA

1.4. If this is a course revision, please indicate the reason for revision (check all that apply):

☐ Course Number, Division, or Prefix	☐ Title	☐ Credit Hours	☐ Pre or Co-Requisites
☐ Catalog Description	☐ Instructional Methods	☐ General Education	☐ Format
☐ Learning Outcomes	☐ Concepts or Content	☐ Institutional Resources	☒ Semester Offered

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2. Detailed Course Description

2.1. Describe why this course (or revision) is needed to meet current or proposed goals and outcomes of the program or College. For revisions, provide explanation and/or justification for change.

This course was approved by the ESF Committee on Curriculum on April 21, 2021. It is a shared resource offering with ERE 480. In a process of switching the semesters offering ERE 480 (from fall to spring semester) and ERE 440 (from spring to fall semester), we now propose to switch the semester offering ERE 580 accordingly from fall semester to spring semester

2.2. Credit hours: 3

2.3. Semester offered (check all that apply): ☐ Fall ☒ Spring ☐ Summer

2.4. Anticipated enrollment per semester offered: Fall _____ Spring 5 Summer _____

2.5. Format (for online courses, please also complete Part 4 Addendum). Check all that apply and include the contact hours per week of each format being used.

- ☒ Lecture 3
- ☐ Lab _____
- ☐ Field _____
- ☐ Studio _____
- ☐ Online _____
- ☐ Other _____

If other checked above, please explain:

2.6. Level of instruction :

Lower Division ☐ Upper Division ☐ Beg. Graduate ☒ Adv. Graduate ☐

2.7. Is this a general education course? Yes ☐ No ☒

2.8. Is this a required course? Yes ☐ No ☒

If yes, please list the program(s) for which it is a requirement:

2.9. Is this course an elective within your department? Yes ☒ No ☐

2.10. Is enrollment in this class restricted? Yes ☐ No ☒

If yes, please explain:

2.11. Are other ESF or SU courses similar or identical to this course? Yes ☐ No ☒

If yes, please identify the courses:

2.12. Is this course a shared resource offering? Yes ☒ No ☐

If yes, what is the course number of the concurrent offering?

ERE 480

2.13. **Student Learning Outcomes**: Identify the student learning outcomes associated with this course.

At the completion of this course students will be able to:
1. Understand the importance of fate and transport of contaminants in global, regional and local environmental issues.
2. Describe fundamental physical, chemical, and biological principles of fate and transport of contaminants in natural and engineered environments.
3. Apply the fundamental principles to identify, conceptualize, formulate, and solve complex contamination problems.
4. Explain fate and transport of common contaminants in various environments.
5. Acquire new knowledge of contemporary contamination issues using appropriate learning strategies.
6. Present a mini review on a contemporary contamination issue (among the provided topics) to 1) synthesize the source of an emerging contaminant and its fate and transport in the natural environment, 2) discuss social, environmental, and health impacts of the contaminant, and 3) analyze its treatment and remediation by current technologies.
7. Evaluate mini review papers developed by peer graduate students and provide review reports on their strength and weakness in achieving Goal 6.

2.14. **Major concepts, processes or tools:** Identify the course content and themes (e.g. Table of Contents) consistent with the learning domains and outcomes.

This course will cover the following concepts:
1. Basic concepts:
   a. Chemical concentration, control volumes, mass balance
   b. Advective/Fickian transport, the advection-dispersion-reaction equation
   c. Basic environmental chemistry and physical chemistry
   d. Chemical distribution among phases
2. Surface waters:
   a. Physical transport in surface water
   b. Sediment transport, particle settling, sediment record
   c. Air-water exchange
   d. Acid-base chemistry, redox chemistry
   e. Dissolved oxygen modeling
   f. Biotransformation and biodegradation, modeling biodegradation
   g. Bioconcentration and bioaccumulation
   h. Abiotic chemical transformation
3. Subsurface environment:
   a. Flow of nonaqueous phase liquids
   b. Retardation
4. Atmosphere:
   a. Atmospheric stability and circulation
   b. Transport of chemicals in the atmosphere
   c. Physical removal of chemicals and chemical reactions
   d. The greenhouse effect and global climate change

2.15. **Instructional methods**: Identify the methods used to meet the course outcomes, as well as the principal instructional methods.

Delivery:
1. Lectures on major concepts, supported by reading textbook, relevant journal articles, agency documents, and pertinent multimedia resources.
2. Discussion of assigned readings and supplementary materials.
3. Guest lecture by professionals in the wastewater/solid waste treatment area.
4. Guidance for developing research papers on contemporary contamination issues, including database search, literature selection, and writing.
5. Seminar discussion on contemporary contamination issues and peer review of research papers.

Evaluation:
1. Pre- and post-course surveys to check whether students understand the importance of fate and transport of contaminants in global, regional and local environmental issues.
2. In-class quizzes that require students to describe fundamental principles of fate and transport and common contaminants in natural and engineered environments.
3. Weekly/biweekly assignments that require students to apply fundamental principles to identify, conceptualize, formulate, and solve complex environmental resources engineering problems.
4. Exams that require students to describe and apply fundamental principles, and explain common contaminants in various environmental compartments.
5. Active participation in seminar discussion on contemporary contamination issues.
6. A mini review paper on a chosen contemporary contamination issue.
7. Oral presentation of major findings and conclusions in the research paper.
8. Peer-view report of papers developed by other graduate students in this course.

2.16. **Course history**: Provide the dates of prior approval of this course, and its revision history. For new courses, enter not applicable.

This course was approved by the ESF Committee on Curriculum on April 21, 2021.

2.17. **Catalog description (max 1000 characters)**: Provide the course description to be included in the ESF catalog

Format: Three hours of lecture per week.

Brief description. If this is a shared resource course, include "Credit will not be given for both 3XX and 5XX":

The fundamental physical, chemical, and biological principles of fate and transport of contaminants. Application of the fundamental principles to analyze complex contamination problems in surface waters, subsurface environment, atmosphere, and engineered environments. Graduate students will write a research paper on contemporary contamination issues.
Note: Credit will not be granted for both ERE 480 and ERE 580.

Semester(s) offered: Spring

Pre/co-requisites: Calculus, General Chemistry, and Introduction to Ecological/Environmental Engineering, or equivalent.

3. New Institutional Impacts

This section pertains to forecasting institutional resource needs to support the course or course revision. Provide clear statements regarding the needs and current availability (or absence) of resources. **Note that, if this is a course revision, only the impacts of the revision should be included.**

3.1. Staffing needs:

3.2. Classroom resources (physical facilities in a laboratory, lecture hall, flexible space, academic computing):

3.3. Technology resources: (e.g., electron microscopes, UAVs, GPS receivers, survey equipment, etc.)

3.4. Computing resources (software licensing, hardware, access):

3.5. Library resources (subscriptions, services):

3.6. Transportation requirements (budget, fees, fleet, vehicles):

3.7. Will there be a course fee required? Yes ☐ No ☐

3.8. Forest properties or field practicum facilities (Note: Please contact Forest properties each semester to schedule):

4. **Online Course Addendum** (only complete for online or hybrid course formats)

4.1. Online Course Format:

- ☐ Asynchronous online (no required real time class meetings)
- ☐ Synchronous online (all class meetings in real time)
- ☐ Combined online (asynchronous with some required synchronous class meetings)
- ☐ Hybrid (In person course with at least 1 credit of work/class meetings held online)

4.2. If there are any real time or live class meetings, how often and how long do you expect them to be?

Course Needs

4.3. Will you be using Blackboard at SU as your learning management system? Yes ☐ No ☐
If no, please explain. Who will provide technical support and troubleshooting for students?

4.4. Which of the following institutional or supported tools will you be using (check all that apply)?

- ☐ Zoom
- ☐ Blackboard Collaborate
- ☐ Kaltura Media
- ☐ CNS Computer labs
- ☐ Other:

4.5. Will students need to use specialized software? Yes ☐ No ☐
If yes, will it be made available to them through the institution, or will they need to purchase it separately?

4.6. Will students need any additional computer hardware, such as a webcam, microphone, or camera?
Yes ☐ No ☐

If yes, what equipment will they need?

Interaction & Assessment

4.7. What are two specific ways that you will provide substantive interaction in your course?

4.8. What is the proposed schedule of regular interaction in the course?

4.9. How will student academic engagement and success be monitored throughout the course?

4.10. How often and by what methods will students be assessed in the course?

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5. Health and Safety Considerations

Will any of the conditions or situations outlined below be present in association with the course?

	Yes	No
5.1. Will substances with any of the following properties be used during instruction: flammability, toxicity, corrosivity, reactivity, registered pesticide, legally controlled, or other characteristics with the potential to cause harm or injury?	☐	☒
5.2. Will any physical hazards be present during instruction? (e.g. machines that need safety guards; razor blades or syringes; compressed gases, etc.)	☐	☒
5.3. Will any biological hazards be present during instruction? (e.g. handling animals [rabies or hantavirus]; cultures or stocks of infectious agents [fungal spores, viruses, bacteria, etc.])	☐	☒
5.4. Will any radiation hazards be present during instruction? (e.g. radiosotopes, X-rays, ultraviolet rays, lasers, etc.)	☐	☒
5.5. Will any electrical equipment that, due to its design, location, or method of use, pose any threat to safety during instruction? (Give considerable thought to electrical use outdoors, or any potentially wet location)	☐	☒
5.6. Will there be any personal safety issues related to the class? (e.g. due to time of day or location, at the end of any organized class exercise, will students be in danger of physical assault, etc.)	☐	☒
5.7. Will any students be driving official state or research sponsored land or water vehicles during any class or instructional exercise?	☐	☒
5.8. Will any type or personal protective equipment be necessary during class exercises? (e.g. hard-hats, eye/face protection, hearing protection, hand/foot protection, lab coat, visibility clothing, etc.)	☐	☒

If the answer was "yes" to any of the health and safety questions, please explain:

For lab and field courses to which all answers are "no", you should explain that here, also. Normally, we would expect some safety precautions for such courses.

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6. Approval Signatures:

All signatures and department level approvals are needed prior to submission to the Academic Affairs Committee.

Yaqi You Digitally signed by Yaqi You Date: 2022.02.03 13:24:47 -05'00' 2/3/22 Wendong Tao Digitally signed by Wendong Tao DN: cn=Wendong Tao, o=SUNY, ou=ESF, email=wtao@esf.edu, c=US Date: 2022.02.04 09:14:36 -05'00'

Department Academic Affairs Committee Representative (if applicable) Date

Lindi Quackenbush Digitally signed by Lindi Quackenbush DN: cn=Lindi Quackenbush, o=SUNY ESF, ou=ERE, email=ljquack@esf.edu, c=US Date: 2022.02.04 16:37:19 -05'00'

Department Chair Date

Provost Date
(if proposal requires additional staffing or resources)

If your proposal will impact other departments/areas, please include email confirmation that those affected have been notified and approve of the change.