

Fall 2020 Plans for teaching in the Department of Earth & Environmental Sciences

Overall mission: We are scientists who study the Earth. We do this work through field, lab and computational methodologies that are reflected in how we teach our courses. We are as disappointed as you are that Fall 2020 requires some adjustments to how we do things, but we're excited by how some of the upcoming changes will help us engage with you in different and in some ways more effective ways. We are committed to your educational success by creatively finding ways to use technology as well as safely meeting in person whenever possible. In more ways than ever, our plans for teaching during Fall 2020 reflect the unique blend of "high-tech" and "hands-on" that characterizes our discipline.

Our faculty are deeply committed to our teaching mission and have presented at national conferences devoted to earth science teaching, published in national journals, and received grants to help us continuously improve our teaching. This summer we have worked together to find solutions to the challenges ahead. Each of our classes is unique and each faculty member has formulated individual ways to continue the teaching mission in the face of this pandemic. Please read below for plans for specific courses.

The majority of our classes are "hybrid" and include in-person activities whenever possible. Our largest classes were forced to move online because of social distancing measures in our auditorium-style classrooms.

How will I get help? All of our faculty have office hours on multiple days of the week and are available by appointment outside of office hours. Per guidance from the university, we will be doing this via Zoom to reduce our footprint on campus. While we'd rather meet in person, Zoom does allow you to share your computer screen with us, which should help us diagnose any technical difficulties that we can help with. Most courses at the 200 level or lower also have teaching assistants (TA's) that will also be available to help students via Zoom and in some classes with laboratories, during the lab session in person.

How will I be tested? Currently we plan to do all testing in hybrid and online courses online. Some faculty may choose to give open note/take-home style exams that do not require exam monitoring, but others may require using exam proctoring services such as Proctor U or Respondus Lockdown. If technology is required, we plan to give you a chance to try out the technology before the day of the exam, so that we can work with you to solve any problems that may arise with technology.

How do I find out more? Many of our courses have already opened their Canvas sites and students should check there for the latest information about specific courses. Students should also feel free to contact the department's Director of Undergraduate Studies, Professor Rebecca Freeman. (Rebecca.freeman@uky.edu)

Individual Course Plans:

EES 110-002: Endangered Planet: Introduction to Environmental Geology: Instructor Summer Brown: Although students have always enjoyed EES 110, they repeatedly mention wishing there was more of an opportunity for dialog but acknowledge it's limited by class size. With upwards of 200 students, this can

be tough in the classroom where time and anxiety can prevent voices from being heard. Once I realized moving online was a possible outcome, I started working hard to incorporate new exercises that allow students to share their own experiences and discuss solutions to some of the biggest problems humanity is facing. For example, we normally learn about climate change but we will now be examining how climate misinformation spreads, discussing our own examples and analyzing problematic news articles and social posts. This opportunity for increased dialog will substantially improve this course and is made possible by the online environment. Lessons and quizzes for EES 110 will be available asynchronously and students will be able to take them multiple times to ensure they understand the material and so I can better track and improve learning (something that we can't easily do in the classroom using paper with such a large class). We will meet every week on Thursday during our scheduled class time to work on the weekly exercise together in small breakout rooms via Zoom so that students do not feel isolated and can rely on each other's strengths to solve problems. As time management is often a concern with online courses, I'm providing all of my students with an actual plan for success, a calendar suggesting exactly what day to read material in the book, watch online lectures, complete quizzes, meet for our weekly exercise, and complete study guide questions. This will help students from getting overwhelmed and increase the chances of them staying on track. If students do want to meet with me, I use an online scheduler that allows them to book a dedicated time slot. They will receive a confirmation and a reminder e-mail before our meeting. I'm excited for this semester and can't wait to see how the new online exercises and discussions improve this course!

EES 110-201: Endangered Planet: Introduction to Environmental Geology: Dr. Kent Ratajeski: This course will be delivered as an asynchronous course this fall semester. I have taught this course multiple times both as an in-person course and as a summer session online course. Online learning and submission of all assignments will be facilitated with the Canvas online course management system. The TA's and I will be actively involved in student learning, and we will be contacting and communicating with individual students throughout the semester. Office hours will be by Zoom, and students are encouraged to email the instructor or TA with questions at any time. Exams will be online and proctored with the University's free Respondus Lockdown Browser and Respondus Monitor software. Finally, some exam review sessions may possibly be carried out synchronously with Zoom.

EES 150-001: Earthquakes & Volcanoes: Professor Rebecca Freeman: This course is identical to the in-person version of the class with all of the same learning outcomes and exercises. The only difference is that "lectures" are pre-recorded and posted on Canvas to be listened to by students on their own time, and "class time", via Zoom, will be used to allow students to do their homework together in small groups with plenty of help from the teaching assistants and me. The TA's and I will hold office hours via Zoom. Exams will be in an open notes/open textbook format that draws from an extensive test bank, ensuring that each student takes a unique version of the exam. Student progress will be closely monitored and we will be reaching out to offer extra help to students who need it. I have a decade of experience in teaching this class, as well as a great deal of experience in teaching online and am committed to making this class as high quality and engaging as possible.

EES 151-001: Quantitative Planet: Professor Keely O'Farrell: EES 151 will be run in a hybrid format. Short lectures will be recorded and available online. Each class period will consist of a brief review of lecture material followed by group work problem sessions conducted either online over Zoom or in person, socially distanced. The course is designed to cater to students with different levels of preparation, so it is designed to provide individual attention to students who need help and still allow

others to work through the material on their own. The TA and instructor will have a couple of office hours each week to provide individual attention to students over Zoom. Because traditionally attendance and keeping up with the material is the key to success in any course (especially a math-based course), there will be short quizzes online in Canvas for students to complete to ensure everyone is watching lectures and understanding the material. In person meetings will be at the discretion of the students and instructors -- in person class time will not be required, and all will be recorded and available online after class for those who can't attend.

EES 160-001-004: Geology for Teachers: Professor Frank Etnersohn: I am trying to do the course as a largely in-person class with social distancing but I am waiting to learn about which classroom we will be using. We will probably not have a classroom large enough to seat everyone with proper social distancing, but we should be able to get a classroom that will seat about half of the class. My plan is to have half of the class meet in person on a Tuesday, while the other half sees the course online via Echo 360, and then alternate groups for Thursday. This way, everyone will have class one time a week and see class online the other time. The labs will be in-person; but we will be splitting the lab periods into 1.5 hour sections for one half of the lab class, and then the other half will come in for the second 1.5 hour section. This way, we will be able to practice social distancing during the lab period. Office hours with the professor and teaching assistants will be via Zoom.

EES 170-201: Blue Planet: Introduction to Oceanography: Professor Rebecca Freeman: This course was listed as an online course before any of us had heard of the pandemic. I have taught an online version of this course as well as an in-person version for almost a decade. The online version includes pre-recorded versions of the same lessons that we would do in class, and all learning objectives and exercises are identical. The teaching assistants and I will be available during office hours and outside of office hours by appointment to offer individualized help to students. We will have synchronous, optional review sessions when needed, and students will have a combination of quizzes, practice problems, and exercises designed to help with exam preparation. Exams will be open notes/book "take home" style exams that will not require online exam proctoring. Student progress will be closely monitored and we will be reaching out to offer extra help to students who need it.

EES 180-201: Geology of the National Parks: Dr. Kent Ratajeski: This course will be delivered as a compressed asynchronous course this fall semester. I have taught this course multiple times as an online course during summer sessions, as a full semester course, and as a compressed course during the regular academic. Online learning and submission of all assignments will be facilitated with the Canvas online course management system. The TA's and I will be actively involved in student learning, and will be contacting and communicating with individual students throughout the semester. Office hours will be by Zoom, and students are encouraged to email the instructor or TA with questions at any time. Exams will be online and proctored with the University's free Respondus Lockdown Browser and Respondus Monitor software. Finally, some exam review sessions may possibly be carried out synchronously with Zoom.

EES 220-001-004: Physical Geology: Dr. Kent Ratajeski: This course will be delivered as a hybrid, synchronous course this fall semester. I have been teaching EES 220 since 2007 mainly as an in-person course, but this last spring successfully taught half the course in an online format. Depending on the classroom that will be assigned to the class, students will rotate through the in-person T-Th lecture, possibly as frequently as once or twice every two weeks; when not attending in person, students will be

able to follow the lecture synchronously with Zoom. Homework and quiz assignments will be completed online with the Canvas online course management system. Exams will be online and proctored with the University's free Respondus Lockdown Browser and Respondus Monitor software. Labs will be a mixture of in-person and online assignments, with students in each lab section divided into two groups (A and B) to accommodate 1.5 hour in-person, hands-on lab sessions; some follow-up work may possibly be submitted online. There are no in-person field trips for this course, but a "virtual field trip" will introduce students to the geology of north-central Kentucky. The TA's and I will be actively involved in student learning and will be contacting and communicating with individual students throughout the semester. Office hours will be by Zoom, and students are encouraged to email the instructor or TA with questions at any time. Finally, some exam review sessions may possibly be carried out synchronously with Zoom.

EES 230: Fundamentals of Geology 1: Instructor Summer Brown: EES 230 is typically a combination of hand sample, map, and field-based exercises. I am putting together rock and fossil kits with hand samples from all of our local field trip stops for each student to pick up at the beginning of the semester. We will meet synchronously during our scheduled class time via Zoom where students will work in small breakout room groups with assistance from both myself and the teaching assistant. New this semester, students will have the option to choose what medium they are more comfortable with for assignments, whether printing and completing by hand and then scanning or completing digitally (for those who are already familiar with illustration software). A few smaller field exercises will occur outdoors on campus (learning to use a compass, practicing efficiency of taking notes and completing outcrop sketches, etc). Two big field projects will be completed virtually as was successfully done last semester in EES 235 (Fundamentals of Geology 2). If students do want to meet with me via Zoom, I use an online scheduler that allows them to book a dedicated time slot. They will receive a confirmation and a reminder e-mail before our meeting. Although a lack of field trips is indeed the biggest change for EES 230, I'm confident that I can still provide the fundamentals of geoscience in such a way that students can refine some of the more important skills associated with field work—problem solving, group work, and improving spatial thinking.

EES 350: Regional Historical Geology: Professor Rebecca Freeman: This hybrid course will be taught in person as long as UK remains in Phase 2 or higher of re-opening. The only online component will be that exams will be taken online. In substitution for a regularly scheduled field trip, students will examine rock samples in class along with examining detailed outcrop photos and satellite images. Office hours with the professor will be held via Zoom.

EES 385: Hydrology and Water Resources: Professor Alan Fryar: I've committed to teach EES 385 in hybrid mode. This will involve having at least one class meeting per month in person, including the first meeting on Aug. 17. I'll be teaching the class synchronously (in 203 Slone when possible) via Zoom and posting recordings of lectures to Canvas. I'll also hold office hours via Zoom. We'll have an on-campus walking field trip. We will have a virtual field trip to McConnell Springs, Royal Spring, and the Georgetown water and wastewater treatment plants, with prompts for students who want to visit the springs on their own as an optional activity.

EES 461: Igneous and Metamorphic Petrology: Professor Dave Moecher: This course will have weekly hands-on labs in a safely socially distanced microscope lab. The lecture course meetings will be either in person or via Zoom, depending on the course of the pandemic. The class will also include a walking tour

around campus to examine examples of igneous and metamorphic rocks that are incorporated into campus buildings. Office hours with the professor and teaching assistant will be via Zoom, and both will be available during the in-person weekly lab meetings.

EES 530: Low Temperature Geochemistry: Professor Andrea Erhardt: Low Temperature Geochemistry will be a personalized experience. Instead of a classic lecture course, this class will be taught in a flipped/tutorial fashion. The class will be divided into three learning groups of ~4 students each. Each week, your group will meet with the professor, either in person or online, depending on preferences and current circumstances. Lectures will be prerecorded, so we will spend that time clarifying concepts, working through problems, and making sure every student has a firm grasp on the material before we move on. The groups may, in the end, progress at different rates, further customizing your instruction. We will have some laboratory activities that can be done at any location, and hope to spend time outside learning about environmental chemistry on campus. Overall, this model should greatly increase student/faculty interaction, create a learning cohort, and leave you, the student, with a comprehensive understanding of the importance of chemistry for understanding geological processes.

EES 550: Fundamental Geophysics: Professor Ed Woolery: This course will meet either in person or via Zoom, depending on the course of the pandemic. The class will include problem-solving exercises and if feasible one or more geophysical instrumentation demonstrations in an outdoor socially distanced setting. There will be two “take-home” styled exams, a midterm and final. Office hours with the professor will be via Zoom who will also be available during in-person lecture meetings.