**University of Florida**
**College of Public Health & Health Professions Syllabus**
**PHC 6304: Environmental Toxicology Applications in Public Health (3 credit hours)**
Fall 2022
Delivery Format: On Campus/Online with synchronous sessions (HyFlex)
Location: HPNP G-114
Time: Thursdays from 5:10 pm to 7:05 pm


| | |
|---|---|
| Instructor Name: | Joseph H. Bisesi Jr, PhD |
| Phone Number: | 352-294-4703 |
| Email Address: | jbisesi@phhp.ufl.edu |
| Office Location: | Center for Environmental and Human Toxicology (Building 471/470) Room 105 |
| Office Hours: | Wednesdays 8:30-9:30 am (via zoom) |
| Teaching Assistant: | TBA |


Preferred Course Communications: The "Inbox" in Canvas will be used for all email correspondence. While the instructor is reachable through their UF email, the Canvas email inbox is preferred to ensure timely responses to course questions.

**Prerequisites**
BSC2010 or equivalent required

CHM2045 or equivalent preferred but not required

**PURPOSE AND OUTCOME**

**Course Overview**
Environmental toxicology examines exposure to chemical, biological, and physical agents and associated health effects in humans and wildlife. Students will analyze environmental fate of chemicals, exposure routes, mechanisms of toxicity, and critique common approaches used by public health professional when dealing with toxicants.

**Course Objectives and/or Goals**
Upon completion of this course, students will be able to:

1. Describe the role of toxicologists in public health, methods used to quantify toxicity, regulations that govern toxic substances, and assessment of risks posed by exposure to toxicants
2. Differentiate the properties of chemicals, biological toxins, and physical agents that influence fate and toxicity in humans, animals, and the environment
3. Defend the use of common environmental toxicology applications in the practice of public health disciplines
4. Critique responses to previous environmental toxicology disasters and suggest alternative approaches to reduce hazard in risk during future environmental toxicology disasters
5. Analyze environmental fate and toxicity data from case studies to identify potential exposure routes, vulnerable populations, and risk mitigation strategies.

**Relation to Program and Learning Outcomes**
Competencies primarily gained in this course

1. Understanding of effects of toxic substances on humans and the environment
2. Diagnose and investigate health problems and assess risks using a community-centered framework
3. Inform, educate, and empower people about the potential hazards of toxic substances to environmental and human health
4. Understand laws and regulations that protect health and ensure safety
5. Communicate effectively with constituencies in oral and written forms

**Competencies reinforced in this course**

1. Recognition of the role of environmental sciences in the health of populations
2. Develop policies and plans that support individual, community, and population health
3. Conduct research for new insights and innovative solutions to health problems

**Instructional Methods**

1. Lectures: Students are responsible for all the material presented. This will be the main source of content in this course.
2. Readings: There are required readings each week. In addition to the required text, supplementary readings and resources will be posted in the course. The reading list may be supplemented during the course.
3. Student Presentations: Students will present on assigned topics and lead discussions.
4. Assessments: The primary assessments will be written assignments, a presentation, and a mid-term and final examination.

**Course Format**

This course will be taught in a concurrent on-campus/on-line format known as HyFlex. What this means is that students enrolled in the on-campus sections of the course will attend class on-campus, Thursdays from 5:10 pm-7:05 pm in HPNP Room G-114. Students that are registered for the online sections will have the option of either coming to class on the day and time described above or participating in the course via live stream. The course will combine both asynchronous content delivery (lectures) as well as weekly synchronous meetings. The weekly synchronous meetings will be on Thursdays from 5:10 pm -7:05 pm. The weekly synchronous meetings will allow time for students to ask questions about lectures or assignments. Additionally, we will use this time for activities that enhance learning such as student presentations and discussions. There will be times when students (on-campus and on-line) will be required to be present at these synchronous meetings (physically or through conferencing software) to facilitate discussions of student presentations. The dates and times for these activities will be posted on canvas.

**What is expected of you?**

You are expected to watch weekly lectures and complete all readings, assignments, and exams. Additionally, you are expected to actively engage in the course throughout the semester. Your participation fosters a rich experience for you and your peers that facilitate overall mastery of the course objectives.

**DESCRIPTION OF COURSE CONTENT**

This course is taught as a series of modules, each covering one specific aspect of environmental toxicology. Each module may contain lectures, external links, videos, discussions and required readings as well as assignments. You are responsible for all course content regardless of the format. The topical Outline/Course Schedule below details the dates of content modules and assignments. Debates and Exams are also listed.

**Course Materials and Technology:**

Textbook (Recommended):

Principles and Practice of Toxicology in Public Health*, 2nd edition*

Ira Steven Richards and Marie Bourgeois, Jones & Bartlett Learning, 2014 ISBN 978-1-4496-4526-7

e-Learning in Canvas site:
There will be an online site for this course in Canvas, the learning management system supported by the University. Log in at https://elearning.ufl.edu/ and go to course site for HSC4507/PHC6304: Environmental Toxicology Applications in Public Health

Here, I will post the syllabus, lecture slides, assignments and allow for communication between the students and course instructors. You will also turn in assignments through this site. Once the course begins, all communication will take place through the e-Learning in Canvas site. This includes all emails. This will eliminate any issues with students not getting emails due to connection problems. It will be your responsibility to check the site on a routine basis to keep up with announcements, emails, and course modifications.

Getting Started

1. Visit http://elearning.ufl.edu and login to e-Learning in Canvas using your Gatorlink ID and password.
2. Find our course website. It will be listed as HSC4507/PHC6304: Environmental Toxicology Applications in Public Health
3. Complete the "Getting Started" Module under the Modules Tool (left menu). This will prompt you to download and review the syllabus, review the materials on plagiarism, and complete the syllabus quiz.

The remainder of the course materials will be locked and unavailable to you until you have completed the "Getting Started" Module. You MUST earn a 100% score on the quiz in this module for the course materials to open in the course site. If you do not receive a 100% score, please review the feedback on your quiz attempt and retake as soon as possible. This is an important element to ensure that all students are aware of the curriculum requirements for this course. If you have ANY difficulty with this quiz, please send an email in the course using the Canvas "Inbox" as soon as possible.

For technical support related to course materials and links, please contact me and the online course coordinator.

For technical support for this e-Learning in Canvas, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- http://helpdesk.ufl.edu/

**Topical Outline:**

| Week | Date(s) | Topic(s) | Class Meeting | Recommended Readings | Assignments due |
|---|---|---|---|---|---|
| | | **Section I: Introduction to Environmental Policy and Enforcement** | | | |
| 1 | 8/25/2022 | Introduction and History of Toxicology | Syllabus Review | Chapter 1 | None |
| 2 | 9/1/202 | What Makes a Chemical Toxic | Lecture review | Chapters 2-4 | None |
| | | **Section II: Environmental Fate of Toxicants** | | | |
| 3 | 9/8/2022 | Environmental Fate of Chemicals in Water | Lecture Review Current Events | Chapter 5 | None |
| 4 | 9/15/2022 | Environmental Fate of Chemicals in Soil/Sediment | Lecture Review Current Events | None | Assignment 1 due |
| 5 | 9/22/2022 | Environmental Fate of Chemicals in Air | Lecture Review Environmental Disasters | None | Environmental Disasters Group 1 Presentation |
| | | **Section III: Exposure and Response** | | | |
| 6 | 9/29/2022 | Understanding Relationships Between Exposure and Effects | Lecture Review Environmental Disasters | Chapter 6 | Environmental Disasters Group 2 Presentation |
| 7 | 10/6/2022 | Exposure Dynamics | Lecture Review Environmental Disasters | Chapters 8-9 | Assignment 2 due Environmental Disasters Group 3 Presentation |
| 8 | 10/13/2022 | Organ Specific Toxicity | Lecture Review Exam Review Current Events | Chapters 12-18 | None |
| 9 | 10/20/2022 | Mid-Term Exam (Online) | No Meeting | None | None |
| | | **Section IV: Environmental Toxicology Applications in Public Health** | | | |
| 10 | 10/27/2022 | The Role of Toxicologists in Public Health | Environmental Disasters | Chapters 19 and 23 | Assignment 3 due Environmental Disasters Group 4 Presentation |
| 11 | 11/3/2022 | Laws and Regulations Governing Toxicants | Lecture Review Environmental Disasters | Chapter 20 | Environmental Disasters Group 5 Presentation |
| 12 | 11/10/2022 | Toxicity Testing Techniques | Lecture Review Current Events | Chapter 21 | None |
| 13 | 11/17/2022 | Epidemiological Approaches to Toxicants | No Meeting (Dr. Bisesi out of town) | Chapter 18 | None |
| 14 | 11/24/2022 | None | No Meeting (Thanksgiving) | None | None |
| 16 | 12/1/2022 | Informed Decision Making and Public Safety | Exam Review | Chapters 24-25 | Assignment 4 due |
| 15 | 12/8/2022 | Emerging Contaminants of Public Health Concern | No Meeting (Reading Days) | None | None |
| 17 | 12/15/2022 | Final Exam | No Meeting | None | None |

**ACADEMIC REQUIREMENTS AND GRADING**

**General information**

Assignments are to be turned in as a Word document or PowerPoint file as directed, unless otherwise indicated. They will be returned to you with comments. If you have unexpected issues with Canvas, you may email the assignment to the course TA and instructor directly. Assignments are normally intended as individual projects unless otherwise directed. Shared work may be treated as a form of plagiarism. Assignments may be required to be submitted via Turnitin in this course (this will be done automatically in the Canvas Assignment). This tool will pick up any passages in students' work that come from another source. Be sure to adequately cite your sources/references for these assignments to avoid plagiarism (see format below). Also please confirm that your work is not overtly plagiarized, the Turnitin system will give you a report. Some similarity is expected and unavoidable, however if large portions are copied from other sources, this will be as considered plagiarism.

The Canvas assignment tool will notify you confirming the submission of your assignment. PLEASE check your UFL email at http://webmail.ufl.edu on a regular basis for these and other email notices from the course site. If you do not receive an email confirmation within 2 hours of submission, please return to the site and resubmit your assignment. It is a student's responsibility to verify that they turn in assignments on time and that they turn in the CORRECT assignment attachment. Please take a few moments to open your submitted attachment and verify that you have submitted the correct file.

You will be graded in the course through the use of written assignments, presentations, graded discussions, and exams.

**Written Assignments (See canvas page for deadlines)**

**There will be 4 assignments (4 assignments worth 50 points each; Total 200 points or 22% of final grade).** The written assignments are designed to reinforce the concepts of each section of the course. Students will be expected to apply knowledge from lectures, readings, and peer reviewed publications to answer questions about a given chemical, including its environmental fate, exposure pathways, effects, and methods used by environmental health professionals to assess the chemicals toxicity. Students will be evaluated on their ability to analyze data and apply concepts from the course to the real-world scenarios presented in the assignments. Assignments are typically 2-4 pages of short answer questions. Written assignments will be due at 11:55 PM on the due date. Late submissions will be subject to the late assignment policy below.

**Environmental Disasters Presentation (Deadlines vary according to assigned topic)**

**Each student will complete a group presentation during the course (200 points or 22% of final grade)**. Each student will be assigned to a group and each group will be assigned a historical contamination event which they will analyze and present on. The group is expected to prepare an 18-20-minute presentation about the event followed by the facilitation of a discussion with the rest of the class. The group will facilitate discussion by providing 2-3 discussion points. The group whose presentation is being discussed is expected to actively participate and facilitate these discussions. Groups will be evaluated on their research and presentation of ten specific areas (given in assignment rubric on canvas) regarding the disaster, as well as their presentation style and discussion leadership. Presentations will be given live in class and recorded. Discussions will be held live after each presentation. There is no limit on number of slides, but groups must use at least 10 primary references in the preparation of their presentation. More details about the presentation will be posted on the canvas site.

**Discussions (Deadlines vary according to assigned discussion)**

**All students will participate in discussions throughout the semesters (4 discussions worth 30 points each, 120 points total or 14% of final grade).** Each graduate student group will lead a discussion following their respective presentation. In addition to leading their discussion, students are expected to participate in the 4

other discussions. Students will receive full credit for these discussions by actively contributing to the discussions. Discussions will be conducted as groups, and as long as students are active participants in the group discussion they will receive full credit. All discussions will take place during live synchronous sessions.

**Exams (Week 9 and Week 17);**

**There will be two in class exams: a midterm (Week 9) and a final (Week 17) (200 points each; Total 400 points or 44% of final grade).** The format for both exams will be **CLOSED BOOK**. The midterm exam will test your knowledge of the first series of modules, including material covered in lectures and assigned readings. The final exam will focus on material covered in modules from the midterm onward; however, as this material builds on concepts presented during the first half of the course, it will be imperative to have a good comprehension of material covered during the first part of the course. Both exams will be comprised of multiple choice, matching, short answer, true/false and 2 essay questions, where you will be expected to interpret the material that is presented in the course and apply it to the scenarios or situations that the exam questions present. You will have 2 hours to complete each exam. Exams will be administered through the Canvas Online Learning System. We will utilize Honorlock proctoring service for all exams. More information on how to take exams will be provided on the course site.

**Grading**

| Graduate Students (PHC6XXX) | | |
|---|---|---|
| Requirement | Due date | Points |
| Written Assignments = 4 @ 50 points | See Course Schedule | 200 |
| Presentation = 1 @ 200 points for grad students | See Course Schedule | 200 |
| Discussions = 120 points total | See Course Schedule | 120 |
| Midterm Exam = 1 @ 200 points | See Course Schedule | 200 |
| Final Exam = 1 @ 200 points | See Course Schedule | 200 |
| | TOTAL | 920 |

Point system used (i.e., how do course points translate into letter grades).

| **Percentage of Points Earned** | 93-100% | 90-92% | 87-89% | 83-86% | 80-82% | 77-79% | 73-76% | 70-72% | 67-69% | 63-66% | 60-62% | Below 62% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Points Earned** | 920-851 | 850-823 | 822-796 | 795-759 | 758-731 | 730-704 | 703-667 | 666-639 | 638-612 | 611-575 | 574-547 | Below 547 |
| **Letter Grade** | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | E |

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0. in all 5000 level courses and above to graduate. A grade of C counts toward a graduate degree only if a sufficient number of credits in courses numbered 5000 or higher have been earned with a B+ or higher. In addition, the Bachelor of Health Science and Bachelor of Public Health Programs do not use C- grades.

Passing grades and Grade Points: Credit Earned

| **Passing Grade** | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grade Points** | 4.0 | 3.67 | 3.33 | 3.0 | 2.67 | 2.33 | 2.0 | 1.67 | 1.33 | 1.0 | 0.67 | 0 |

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:
http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

**Late Assignments and Make Up Work**
Assignments turned in up to 24 hours late will be discounted **10%** of the grade that they would otherwise receive. Assignments turned in more than 24 hours late will **not** be graded and will contribute zero points toward your final grade, unless arrangements have been made in advance with the instructor. Missed assignments will contribute zero points toward your final grade.

**Special Circumstances.**

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

In the event of exceptional situations that may interfere with your ability to perform an assignment or meet a deadline, contact the instructor as soon in advance of the deadline as possible. Such special cases will be dealt on an individual basis, provided that you have sufficient documentation.

Please note: Any requests for make-ups due to technical issues MUST be accompanied by the UF Computing help desk (http://helpdesk.ufl.edu/) correspondence. You MUST e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

**Policy Related to Required Class Attendance**
All faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy see the Registrar website for additional details:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

**STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT**

**Expectations Regarding Course Behavior**
You are expected to maintain a civil tone and respect the opinions of other posters. While commenting on others' posts is encouraged, aggressive or patronizing tone and language are unacceptable and may result in the loss of your posting and discussion privileges.

**Communication Guidelines**
It is preferred that you contact the professor by email using the "Inbox" in Canvas for clarification and assistance with the course material and the assignments, and for special issues that may arise. Weekday daytime (US Eastern Time) emails have the best chances of being answered quickly.

**Academic Integrity**

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

"**We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity**."

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

**"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:
https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
http://gradschool.ufl.edu/students/introduction.html

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

**Recording Within the Course:**

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

**Policy Related to Guests Attending Class:**

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are **not** permitted to attend either cadaver or wet labs. Students are

responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Link to full policy:
http://facstaff.phhp.ufl.edu/services/resourceguide/getstarted.htm

**Online Faculty Course Evaluation Process**
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

**Online Synchronous Sessions**
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared.

However, it's important to note that this course requires live presentations and discussions during online synchronous sessions. To successfully complete these assessments participation via video and audio will be required. Therefore, if you do not agree to participate with video and audio you will be unable to complete these assignments and will not meet the requirements to complete this course.

**SUPPORT SERVICES**

**Accommodations for Students with Disabilities**
If you require classroom accommodation because of a disability, it is strongly recommended you register with the Dean of Students Office http://www.dso.ufl.edu within the first week of class or as soon as you believe you might be eligible for accommodations. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please do this as soon as possible after you receive the letter. Students with disabilities should follow this procedure as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

**Counseling and Student Health**
Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The **Counseling and Wellness Center** 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: http://www.counseling.ufl.edu. On line and in person assistance is available.

- **U Matter We Care** website: http://www.umatter.ufl.edu/. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.

- The **Student Health Care Center** at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: https://shcc.ufl.edu/

- Crisis intervention is always available 24/7 from: Alachua County Crisis Center: (352) 264-6789 http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx

- **University Police Department**: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

- **UF Health Shands Emergency Room / Trauma Center:** For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

**Inclusive Learning Environment**

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu