

ENV H 405 – TOXIC CHEMICALS AND HUMAN HEALTH

Quarter: Spring 2025
Credits & Grading: 4 credits, graded
Time: Mondays, Wednesdays & Fridays, 1:30 to 2:20 pm
Location: [Health Sciences Education Building](#), room HSEB 245

CONTACT INFORMATION

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LAND ACKNOWLEDGEMENT

We acknowledge the Coast Salish people of this land, the land which touches the shared waters of all tribes and bands within the Duwamish, Suquamish, Tulalip and Muckleshoot nations.

ILLNESS PROTOCOL

If you feel ill or exhibit respiratory or other symptoms, you should not come to class. Seek medical attention if necessary and notify your instructor(s) as soon as possible by email. Follow the [COVID-19 Public Health Flowchart](#) if you have COVID-19 symptoms, exposure or test positive, and adhere to the [UW Face Covering Policy](#).

Additional recommendations include getting your [annual flu shot](#) and getting boosted with the updated COVID vaccines (available [at clinics and pharmacies, as well as through UW Medicine](#) and local health agencies).

Please check your email and Canvas Announcements daily BEFORE coming to class. If we need to conduct class remotely because the instructor or a guest speaker is unable to attend in person, we will send all registered students an email/and or post a Canvas Announcement with a Zoom link for remote instruction or a plan for making up the class. Thank you for your patience and support as we try to maintain in-person learning while staying safe!

COURSE DESCRIPTION

Welcome to ENV H 405! This course will survey the most important concepts in toxicology, with a focus on the impact of chemicals on human and environmental health. Topics include principles underlying dose-response relationships, absorption, distribution, metabolism, and elimination, followed by lectures on specific topics, including damage to major organs, cancer, birth defects, occupational hazards, and risk assessment and government regulation of environmental contaminants.

COURSE LEARNING OBJECTIVES

After completing this course, students should be able to:

- > Outline relevant events in the history of toxicology, and the professional disciplines, job classifications and scientific fields occupied by toxicologists.
- > List the main classes of toxicants.
- > Describe the main factors influencing toxicity, including emerging factors such as racial and socioeconomic disparities.
- > Summarize the basics of toxicant absorption, distribution, metabolism and excretion.
- > Explain how environmental toxicants interact with cellular pathways leading to the development of diseases.
- > Recall strategies to limit toxicant exposures inside and outside the workplace.
- > Discuss, present, criticize and evaluate past and current events relevant to the field of toxicology.
- > Develop increased knowledge of one or various toxicants of interest.
- > Demonstrate effective oral and written communication skills, as well as teamwork.
- > Reflect on the relevance of the field of toxicology to them as scientists and proactive members of the society.

COUNCIL ON EDUCATION FOR PUBLIC HEALTH (CEPH) COMPETENCIES

The School of Public Health (SPH) is accredited by the Council on Education for Public Health (CEPH). Competencies met by this course include:

D-10-1 Public Health Domains

- > Overview of Public Health: Address the history and philosophy of public health as well as its core values, concepts, and functions across the globe and in society (this course covers public health history).
- > Role and Importance of Data in Public Health: Address the basic concepts, methods, and tools of public health data collection, use, and analysis and why evidence-based approaches are an essential part of public health practice.
- > Human Health: Address the underlying science of human health and disease including opportunities for promoting and protecting health across the life course (this course covers the science of human health and disease).
- > Determinants of Health: Address the socio-economic, behavioral, biological, environmental, and other factors that impact human health and contribute to health disparities (this course covers: biological factors' impacts on human health and health disparities; environmental factors' impacts on human health and health disparities).
- > Health Policy, Law, Ethics, and Economics: Address the basic concepts of legal, ethical, economic, and regulatory dimensions of health care and public health policy, and the roles, influences and responsibilities of the different agencies and branches of government (this course covers: legal dimensions of health care and public health policy; regulatory dimensions of health care and public health policy).

COURSE FORMAT

Over the course, there will be content posted on Canvas to work on before and/or after each session. The expectation is that students come to class having already reviewed any content available on Canvas. There will be post-class weekly quizzes to ensure students understood and retained important information in each session. Participation (questions and comments) during the class is highly encouraged and partially graded via PollEverywhere. All sessions will be recorded and uploaded

to Canvas for instructional purposes related to this class. Students are not permitted to copy or share the recording with others. If you have privacy concerns about Zoom recordings in this class, please contact the course instructor.

There will be experts in some of the proposed topics providing guest lectures throughout the course. The instructor welcomes any feedback you may have to improve their teaching and this course.

USEFUL TEXTBOOKS & READINGS

Useful Textbooks:

- > Casarett & Doull's Essentials of Toxicology, 4th Edition, Curtis D. Klaassen & John B Watkins III, McGraw Hill, 2021.
(This textbook is available as an eBook through the UW Libraries, or through this [website](#))
- > A Small Dose of Toxicology: The Health Effects of Common Chemicals, 3rd Edition, Steve Gilbert, 2019.
(Available as an eBook [here](#))
- > Introduction to Toxicology, 3rd Edition by John Timbrell, Taylor & Francis, 2002.

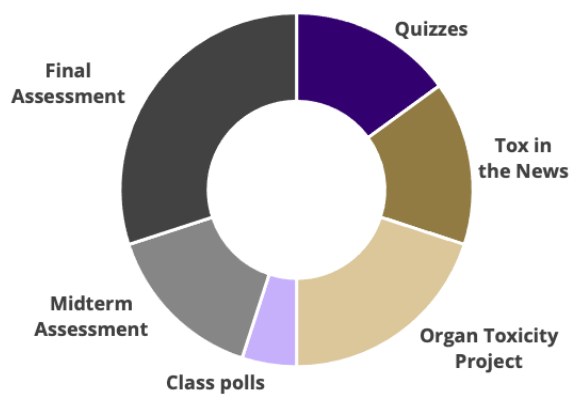
Recommended, optional, or supplementary readings

Most required readings will be available as Canvas Pages or Adobe Acrobat files that can be viewed on Canvas or downloaded. In some cases, the readings may be links to websites. Videos will also be available on Canvas Pages.

GRADING

Final grades will be determined by:

- > Weekly quizzes and in-class activities (15%)
- > Assignment (15%): Toxicology in the News
- > Project (20%): Pick your poison Project
- > Class polls (5%)
- > Midterm assessment (15%)
- > Final assessment (30%)



Toxicology in the News: You will be assigned a date to present and post about a recent (within the past 4 months) toxicology-related event sourced from newspapers, news outlets, or reputable online platforms. The objective of this assignment is to highlight the relevance of toxicology in everyday life. Additional instructions will be provided on Canvas.

Pick your poison Project: In groups of 2 or individually, you will choose a toxicant of personal interest, ranging from those relevant to your birthplace to those featured in the news or of particular interest. This selection must be made within the first 2 weeks of the quarter. Throughout the course, you'll progressively develop your project, incorporating newfound concepts and toxicological insights related to your chosen toxicant. Feedback will be provided throughout the course. At the end of the quarter, you will submit a final report (poster). Further details will be provided on Canvas. To avoid having more than one student/group writing a project on the same toxicant, be sure to have your toxicant approved by the instructor at your earliest convenience.

Grading Criteria

A 4.0 scale will be calculated using the following conversion:

4.0 Scale	Percentage	4.0 Scale	Percentage	4.0 Scale	Percentage
4.0	≥ 98%	2.8	≥ 83.1%	1.6	≥ 68.2%
3.9	≥ 96.8%	2.7	≥ 81.8%	1.5	≥ 66.9%
3.8	≥ 95.5%	2.6	≥ 80.6%	1.4	≥ 65.7%
3.7	≥ 94.3%	2.5	≥ 79.4%	1.3	≥ 64.5%
3.6	≥ 93%	2.4	≥ 78.1%	1.2	≥ 63.2%
3.5	≥ 91.8%	2.3	≥ 76.9%	1.1	≥ 62%
3.4	≥ 90.5%	2.2	≥ 75.6%	1.0	≥ 60.7%
3.3	≥ 89.3%	2.1	≥ 74.4%	0.9	≥ 59.5%
3.2	≥ 88.1%	2.0	≥ 73.2%	0.8	≥ 58.2%
3.1	≥ 86.8%	1.9	≥ 71.9%	0.7	≥ 57%
3.0	≥ 85.6%	1.8	≥ 70.7%	0.6	≥ 55.8%
2.9	≥ 84.3%	1.7	≥ 69.4%	0.5	≥ 54.5%

Late assignment policy

All quizzes, assignments, and individual projects must be submitted through Canvas by the due date. Please, reach out to us if you cannot submit an assignment on time. The instructor understands that in some instances, certain personal situations may make it impossible to submit a specific material on time. For this reason, there is no penalty for the submission of late assignments, but the instructor reserves the right to institute a penalty of 10% if students do not submit materials within the required timeframe on multiple occasions.

COURSE SESSION SCHEDULE

Any changes will be announced in class and/or posted on Canvas.

Date	Topic	Guest Instructor
3/31	Overview/History of Toxicology	
4/2	Basic Principles of Toxicology	
4/4	Biological Disposition I-absorption, distribution	
4/7	Biological Disposition II – biotransformation	
4/9	Biological Disposition III – excretion	
4/11	Mechanisms/Factors that Modify Responses	

Date	Topic	Guest Instructor
4/14	Toxicity Testing Procedures	
4/16	Hepatotoxicity	Dr. Julia Cui
4/18	GI Toxicology and the Microbiome	Dr. Julia Cui
4/21	Neurotoxicology	
4/23	Genetic Toxicology and Chemical Carcinogenesis	
4/25	Pulmonary Toxicology	Mr. Elijah Scott
4/28	Ecotoxicology	
4/30	Developmental and Reproductive Toxicology	Mr. Brad Hansen
5/2	Occupational Toxicology	Dr. Brittany Weldon
5/5	Food Additives and Contaminants	
5/7	Natural Toxins	
5/9	Midterm Assessment	
5/12	Pesticides I	Ms. Hanna Dye
5/14	Pesticides II	Ms. Hannah Dye
5/16	Drugs as Toxicants	Dr. Michael Garry
5/19	Metals I	
5/21	Metals II	
5/23	Cardiovascular Toxicology (tentative)	Mr. Allen Louie
5/26	Memorial Day – NO CLASS	
5/28	Household Products	
5/30	Risk Assessment	
6/2	Regulatory Toxicology	
6/4	Review Session for final exam	
6/6	Emerging Factors Affecting Toxicity & farewell	
6/9	Final Assessment (2:30-4:20 pm)	

COMMUNICATION AND WRITING SKILLS

Communication through writing and speaking is an important transferable skill for all career pathways. Establishing a strong foundation in communication skills will help you be successful

throughout your future course work and career. Therefore, this course includes assignments with the goal to help you identify areas of strength and improvement in your communication. If you feel that you could benefit from additional opportunities to improve your writing skills in particular, a list of resources at the UW and others accessible online can be found on the [SPH website](#).

IMPORTANT POLICIES & RESOURCES

ACADEMIC INTEGRITY

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity.

The UW School of Public Health (SPH) is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, unauthorized use of artificial intelligence (AI) tools, and other misconduct are serious violations of the University of Washington [Student Conduct Code \(WAC 478-121\)](#). We expect you to know and follow the university's policies on cheating and plagiarism, and the SPH Academic Integrity Policy. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington [Community Standards and Student Conduct](#).

USE OF GENERATIVE ARTIFICIAL INTELLIGENCE IN COURSEWORK

Artificial Intelligence (AI) tools, though useful in many contexts, are inappropriate for use in this course. An important outcome of this course is to strengthen your own abilities as a thinker and communicator. That is only possible when you do your own work. You may not submit work that is written wholly or partially by an AI tool. Assignment submissions may be run through AI detection software. If your submission appears to have been written using AI, you may either receive a failing grade or be asked to resubmit.

ACCESS AND ACCOMODATIONS

Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Contact DRS at disability.uw.edu.

RELIGIOUS ACCOMODATIONS

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at

[Religious Accommodations Policy](#). Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](#).

INCLUSION & DIVERSITY

Diverse backgrounds, embodiments and experiences are essential to the critical thinking endeavor at the heart of University education. In SPH, we are expected:

1. To respect individual differences, which may include, but are not limited to, age, cultural background, disability, ethnicity, family status, gender, immigration status, national origin, race, religion, sex, sexual orientation, socioeconomic status and veteran status.
2. To engage respectfully in the discussion of diverse worldviews and ideologies embedded in course readings, presentations and artifacts, including those course materials that are at odds with personal beliefs and values.
3. To encourage students with concerns about classroom climate to talk to their instructor, adviser, a member of the departmental or SPH EDI Committee, the Assistant Dean for EDI, or the program's director.

CLASSROOM CLIMATE

We are co-creators of our learning environment. It is our collective responsibility to develop a supportive learning environment for everyone. Listening with respect and an open mind, striving to understand others' views, and articulating your own point of view will help foster the creation of this environment. We engage our differences with the intent to build community, not to put down the other and distance our self from the other. Being mindful to not monopolize discussion and/or interrupt others will also help foster a dialogic environment.

The following guidelines can add to the richness of our discussion:

- > We assume that persons are always doing the best that they can, including the persons in this learning environment.
- > We acknowledge that systematic oppression exists based on privileged positions and specific to race, gender, class, religion, sexual orientation, and other social variables and identities.
- > We posit that assigning blame to persons in socially marginal positions is counter-productive to our practice. We can learn much about the dominant culture by looking at how it constructs the lives of those on its social margins.
- > While we may question or take issue with another class member's ideology, we will not demean, devalue, or attempt to humiliate another person based on her/his experiences, value system, or construction of meaning.
- > We have a professional obligation to actively challenge myths and stereotypes about our own groups and other groups so we can break down the walls that prohibit group cooperation and growth.

[Adapted from Lynn Weber Cannon (1990). Fostering positive race, class and gender dynamics in the classroom. *Women Studies Quarterly*, 1 & 2, 126-134.]

We are a learning community. As such, we are expected to engage with difference. Part of functioning as a learning community is to engage in dialogue in respectful ways that supports learning for all of us and that holds us accountable to each other. Our learning community asks us to trust and take risks in being vulnerable.

Here are some guidelines that we try to use in our learning process:

- > LISTEN WELL and be present to each member of our group and class.
- > Assume that I might miss things others see and see things others miss.
- > Raise my views in such a way that I encourage others to raise theirs.
- > Inquire into others' views while inviting them to inquire into mine.
- > Extend the same listening to others I would wish them to extend to me.
- > Surface my feelings in such a way that I make it easier for others to surface theirs.
- > Regard my views as a perspective onto the world, not the world itself.
- > Beware of either-or thinking.
- > Beware of my assumptions of others and their motivations.
- > Test my assumptions about how and why people say or do things.
- > Be authentic in my engagement with all members of our class.

PRONOUNS

We share our pronouns because we strive to cultivate an inclusive environment where people of all genders feel safe and respected. We cannot assume we know someone's gender just by looking at them. So we invite everyone to share their pronouns.

BIAS CONCERNS

The Office of the Dean has a [student concern policy](#), a faculty concern policy and standard HR procedures for staff concerns. Our 2018 climate survey states that most people in SPH do not report bias incidents because they do not know where to go. Students are encouraged to report any incidents of bias to someone they feel comfortable with, including instructors, advisers or department staff. They can email dcinfo@uw.edu for immediate follow up. Bias concerns can be anonymously and confidentially reported at this [link](#). Data is collected by the Assistant Dean for EDI and the Director of Program Operations for Student and Academic Services and tracked for resolution and areas are identified for further training.

SEXUAL HARASSMENT

Sexual harassment is a form of harassment based on the recipient's sex that is characterized by:

1. Unwelcome sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature by a person who has authority over the recipient when:
 - > Submission to such conduct is an implicit or explicit condition of the individual's employment, academic status, or ability to use University facilities and services, or
 - > Submission to or rejection of the conduct affects tangible aspects of the individual's employment, academic status, or use of University facilities.
2. Unwelcome and unsolicited language or conduct that creates an intimidating, hostile, or offensive working or learning environment, or has the purpose or effect of unreasonably interfering with an individual's academic or work performance.

If you believe that you are being harassed, or have observed harassment, you can report it to SPH using the [bias concerns link](#). The University also has designated offices to help you: [SafeCampus](#); [Office of the Ombud](#); [Title IX Investigation Office](#); and [University Complaint Investigation and Resolution Office](#).

HEALTH & WELLNESS SUPPORT

We need to take care of ourselves inside and outside of class. Start with the Husky Health and Well-Being site for a comprehensive list of Husky Health and wellbeing supports on campus, including: food assistance, substance use, and getting connected to support at <https://wellbeing.uw.edu>.

For support within the School of Public Health, you can reach out to Jen Nguyen (jenquan8@uw.edu), advisors, or your instructors for additional support. Additional mental health support is available through the UW Counseling Center at 206.543.1240 or by going to <https://www.mentalhealth.uw.edu>.

UW also offers real-time and confidential connection to Licensed Mental Health counselors 24/7 through the Husky HelpLine at 206.616.7777 as well as through chat through the website: <https://wellbeing.uw.edu/huskyhelpline/>.