



# ENVST-UA 100

## Environmental Systems Science

### Fall 2025

#### Course Information

Units: 4

Class Hours: Mondays & Wednesday, 11 AM - 12:15 PM

Class Location: 19 West 4th St, Room 101

#### Instructor Information

- **Professor: Yi Yin, PhD**

Email: yi.yin@nyu.edu

Office Address: 79 Washington Square East, Office 609

Office Hours: Monday, Wednesday 3-5 PM

by calendar appointment [HERE](#)

- **Recitation Leaders**

##### **Emily Blackwell**

Email: eab9724@nyu.edu

Office Hours: Monday 12:15-2PM, Wednesday 9-11AM

by calendar appointment [HERE](#)

##### **Jannah Colborn**

Email: jc14070@nyu.edu

Office Hours: Wednesday, Thursday 1-3 PM

by calendar appointment [HERE](#)

##### **Ivonne Serna**

Email: ijs283@nyu.edu

Office Hours: Thursday, Friday 10 AM - 12 PM

by calendar appointment [HERE](#)



## Recitations

	Time	Room	Recitation Leader
002	Thursdays 8:00-9:15am	Goddard Hall, Room C16	Ivonne
003	Thursdays 8:00-9:15am	Goddard Hall, Room C02	Emily
004	Fridays 9:30am-10:45am	181 Mercer Street, Room 302	Jennah
005	Fridays 12:30-1:45pm	Goddard Hall, Room C02	Emily
006	Fridays 8:00am-9:15am	Silver Center, Room 620	Ivonne
007	Fridays 8:00am-9:15am	181 Mercer Street, Room 303	Jennah

## Course Overview

From climate change to clean air and water, many of today's most urgent challenges are environmental, and solving them starts with understanding how our planet works. Environmental Systems Science is an interdisciplinary field that studies the physical, biological, and human components of the Earth system to address environmental challenges such as pollution, resource management, climate change, and sustainability.

*ES100*, a required core course for all Environmental Studies majors and minors, aims to build a strong foundation in understanding environmental systems while introducing basic research methods and analytical tools. Designed for students from all backgrounds, it offers an accessible entry point into environmental science and prepares you for more advanced courses.

Specific lecture topics are listed in the **Course Calendar** below. Recitation sessions will build foundational skills, including environmental data collection, analysis, and visualization using Excel or Google Sheets, as well as conducting literature reviews. By integrating scientific methods with real-world environmental challenges, the course develops a systems-based perspective that prepares students for in-depth studies in their areas of interest.

## Learning Goals

1. **Understand Environmental Systems:** Describe the key components of environmental systems, including Earth's energy balance, atmosphere, hydrosphere, biosphere, geosphere, ecosystems, and human-built environments.



2. **Apply Systems Thinking:** Use systems thinking to understand the complexity and interconnectedness of natural and human systems.
3. **Evaluate Human Impacts:** Assess how human activities such as agriculture, urbanization, and industrialization affect environmental systems and contribute to challenges like climate change, biodiversity loss, and pollution.
4. **Experiment with Environmental Data Collection and Analysis:** Participate in field measurements of environmental data such as temperature, noise and air pollution, analyze and visualize the data.
5. **Strengthen Critical Thinking and Communication:** Develop critical thinking, data analysis, and communication skills through case studies, scientific literature, and policy analysis.

## NYU Brightspace

The syllabus, reading materials, assignments, quizzes, and Zoom links are available on the course Brightspace site. Further information on all assignments, course requirements, course policies, and assessment/evaluation of student work will be provided both in class meetings and on Brightspace.

## Course Calendar

	Monday	Wednesday	Recitation	Assignment Due before the next Recitation
<b>Part I: Foundations &amp; Physical Systems</b>				
Sep 1, 3		Environmental Systems Science Overview  Systems & The Gaia Hypothesis		<i>Assignment 1 Self-introduction: background, interests, and expectations</i>
Sep 8, 10	Physical Systems (I) Global Energy Balance	Physical Systems (II) The Atmosphere: Earth's Gaseous Envelope	Exploring Earth's Radiative Balance with Excel/Google Sheets	<i>Assignment 2 Calculate Earth's energy balance</i>
Sep 15, 17	Physical Systems (III) The Hydrosphere: Earth's Blanket of Water and Ice	Physical Systems (IV) The Geosphere: Earth Beneath Our Feet	Tracking Freshwater Storage Change with Satellite Observations	<i>Assignment 3 Analyze observed changes in freshwater storage</i>

	Monday	Wednesday	Recitation	Assignment Due before the next Recitation
<b>Part II: Biological Systems and Biogeochemical Cycles</b>				
Sep 22, 24	Biological Systems (I) The Biosphere & Life on Earth	Biological Systems (II) Ecosystem Structure & Function	Build trophic pyramids and calculate energy efficiency	<i>Assignment 4</i> <i>Calculate energy efficiency across trophic levels</i>
Sep 29, Oct 1	Biological Systems (III) Evolution and Biodiversity	Complexity Systems – Scales and Scaling Laws	Practice scaling laws	<i>Assignment 5</i> <i>Estimate using up-scaling methods</i>
Oct 6, 8	Biological Systems (IV) Biomes of the World	The Carbon Cycle	Simple carbon budget exercises: understand pools & fluxes	
Oct 14, 15	The Nitrogen & Phosphorus Cycle: Linkages Across Cycles	<b>Mid-term Exam</b>		
<b>Part III: Tools &amp; Methods in Environmental Science</b>				
Oct 20, 22	Environmental Research Methods: research questions and hypothesis development	Environmental Data Collection & Monitoring	Experiment with Environmental Sensors	<i>Assignment 6</i> <i>Collect environmental data around campus</i>
Oct 27, 29	Data Analysis & Visualization	Literature Review & Scientific Communication	Reading Scientific Literature & Prep for Final Project	<i>Assignment 7</i> <i>Analyzing a research paper</i>
<b>Part IV: Human-Environment Interactions</b>				
Nov 3, 5	Energy Systems & Sustainability Fossil fuels, renewables, transitions	Air & Environmental Pollutions	Working with Field Observations	<i>Assignment 8</i> <i>Visualize field data &amp; analysis</i>
Nov 10, 12	Land Use & Land Cover Change  Prof. Anamika Shreevastava	Urbanization  Emily Blackwell	Land cover change analysis with Google Earth	<i>Assignment 9</i> <i>Land cover change for a place of interest</i>
Nov 17, 19	Climate Change (I) Science & Evidence  Dr. Qingyu Wang	The Anthropocene  Prof. Dale Jamieson	IPCC report discussion groups	



Nov 24, 26	Climate Change (II) Impacts, Adaptation, and Mitigation  <a href="#">Ivonne Serna</a>	Legislative Friday	Thanksgiving break	
Dec 1, 3	Environment & Health Environmental Justice & Equity  <a href="#">Prof. Prince Amegbor</a>	Sustainability at NYU  <a href="#">Cecil Scheib (NYU Chief Sustainability Officer)</a>	<b>Presentation of Final Project (I)</b>	
Dec 8, 10	Conservation Biology & Restoration Ecology  <a href="#">Prof. Michael Webster</a>	Integrative Systems Thinking	<b>Presentation of Final Project (II)</b>	Assignment 10 (Post-assessment)
Dec 17	<b>Final Write-up due Wednesday, December 17</b>			

## Materials

- **Readings.** This course has no textbook. Instead, weekly readings will complement lectures and guide discussions throughout the semester. All readings will be available via the course website.
  - o **Recommended Textbook**  
[The Blue Planet: An Introduction to Earth System Science](#)  
[Earth System Science: A Very Short Introduction](#)  
[The Earth System](#)
  - o **Recommended Reading**  
[Gaia: A New Look at Life on Earth](#)  
[Life Ascending: The Ten Great Inventions of Evolution](#)
- **Software.** We will use Microsoft Excel to build basic understanding about scientific data analysis. NYU provide access [here](#). It is one of the critical skills we want to build in this course and please get familiar with this software in the first two weeks.

## Grading

Attendance	5%
Homework	35%
Mid-term Exam	30%
Final Presentation + Write Up	30%



## Attendance & Remote Participation

Students are expected to attend class, arrive on time, and stay the entire length of class. An attendance sheet will be distributed before each class. Please make sure to sign in before the class starts so your participation is recorded. Remote access will be provided via Zoom to accommodate students when needed. You may attend up to **5 lectures** and **2 recitations** remotely during the semester without asking for permission. If you are feeling unwell, please prioritize your health and the health of others—join via Zoom. If you need additional accommodations for unavoidable conflicts, please contact your recitation leader to discuss arrangements.

## Expectations from Participants

- Use personal devices in the classroom only for class-related activities.
- Exhibit professional conduct and attitude, including appreciation for all types of diversity, respect for the instructor, guest speakers, and fellow class participants, and acknowledgement and acceptance of differing ideas and opinions.
- Practice and honor the College of Arts & Science Honor Code and the University Student Conduct Policy.

## Mid-term Exam

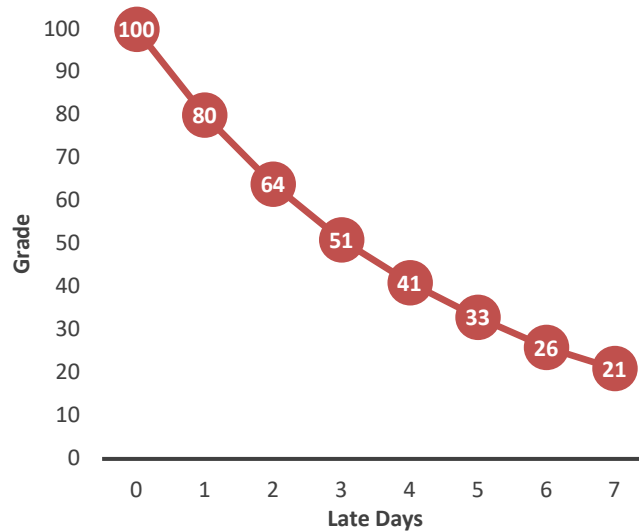
You can bring your notes, books and reading materials to the exam but no digital devices.

## Assignments

Homework will be assigned during weekly recitations and is due before the start of the following recitation. If you turn in homework late, your grade will *decay exponentially* — dropping by 20% each day. The plot below shows how quickly your points “melt away” over the course of a week. To keep the most points, turn it in on time! And don’t worry—we’ll learn how to make plots like this ourselves. Play with your own [decay rate](#) and see how things change.



## Grade decay over time



### Extra credit - special talks and events

Throughout the semester, there will be opportunities to attend special talks and events. Students may earn extra credit by attending up to two of these events (one extra point for one event). Our teaching team will share opportunities through email and classroom announcements. You may attend any relevant event (in person or live online, not recorded), but you must receive approval from your recitation leader beforehand. To receive credit, you must submit a one-page, concise summary of the event, including your thoughts on the topic to your recitation leader.

### Grading Scale

Final letter grades will be assigned according to the schedule below, which uses a percent scale (0-100) calculated from the total number of points during the semester.

A	$100 > x \geq 94.45$
A-	$94.45 > x \geq 89.45$
B+	$89.45 > x \geq 86.45$
B	$86.45 > x \geq 82.45$
B-	$82.45 > x \geq 79.45$
C+	$79.45 > x \geq 76.45$
C	$76.45 > x \geq 72.45$
C-	$72.45 > x \geq 69.45$
D+	$69.45 > x \geq 66.45$
D	$66.45 > x \geq 62.45$
F	$62.45 > x$



## Academic Integrity

Academic integrity means that the work you submit is original. Obviously, bringing answers into an examination or copying all or part of a paper straight from a book, the Internet, or a fellow student is a violation of this principle. But there are other forms of cheating or plagiarizing which are just as serious — for example, presenting an oral report drawn without attribution from other sources (oral or written); writing a sentence or paragraph which, despite being in different words, expresses someone else's idea(s) without a reference to the source of the idea(s); or submitting essentially the same paper in two different courses (unless both instructors have given their permission in advance). Receiving or giving help on a take-home paper, examination, or quiz is also cheating, unless expressly permitted by the instructor (as in collaborative projects).

## AI Policy

While generative AI tools can be useful resources in your coursework, they come with both benefits and risks. Responsible and ethical engagement with AI is a skill you will develop over time. However, your **own insights, critical thinking, and voice are essential** to your learning. AI tools should never be used as a substitute for your original thinking, reflections, or writing. The learning process, including grappling with ideas, analyzing evidence, and expressing your perspective, is how you build the skills that will serve you in this class and beyond. You can experiment with AI tools for brainstorming, organizing, or exploring perspectives, but **any use must follow academic integrity guidelines and be transparently acknowledged**. Ultimately, your growth depends on the work *you* do.

## Disability Disclosure Statement

Academic accommodations are available to any student with a chronic, psychological, visual, mobility, learning disability, or who is deaf or hard of hearing. Students should please register with the Moses Center for Students with Disabilities at 212-998-4980 or [mosescsd@nyu.edu](mailto:mosescsd@nyu.edu). The Moses Center website is [www.nyu.edu/csd](http://www.nyu.edu/csd).

## Student Wellness

In a large, complex community like NYU, it's vital to reach out to others, particularly those who are isolated or engaged in self-destructive activities. Student wellness (<https://cas.nyu.edu/content/nyu-as/cas/academic-programs/student-wellness.html>) is the responsibility of all of us.



The NYU [Wellness Exchange](#) is the constellation of NYU's programs and services designed to address the overall health and mental health needs of its students. Students can access this service 24 hours a day, seven days a week - [wellness.exchange@nyu.edu](mailto:wellness.exchange@nyu.edu); (212) 443-9999. Students can call the Wellness Exchange hotline (212-443-9999) or the NYU Counseling Service (212-998-4780) to make an appointment for Single Session, Short-term, or Group counseling sessions.

## Religious Holidays

[NYU's Calendar Policy on Religious Holidays](#) states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.