

**SUSTAINABILITY SCIENCE:  
INTERACTIONS BETWEEN HUMAN AND ENVIRONMENTAL SYSTEMS  
SOS 526/ BIO 526/ GCU 526**

*Semester:* Spring term 2024

*Meeting Times:* Tuesday and Thursday, 10:30am-11:45am, LSE 505

*Arizona State University Faculty:*

Oswaldo Sala ([Oswaldo.Sala@asu.edu](mailto:Oswaldo.Sala@asu.edu))

Life Sciences A, Room 218

480-965-4120

Office Hours: By Appointment

To set up a meeting, please send an email request to [Emilie.Gonzalez@asu.edu](mailto:Emilie.Gonzalez@asu.edu)

B. L. Turner II

School of Geographical Sciences and Urban Planning

To set up a meeting, please send an email request to [Billie.L.Turner@asu.edu](mailto:Billie.L.Turner@asu.edu)

Table of Contents

|                                                               |          |
|---------------------------------------------------------------|----------|
| <b>A) Course Overview</b> .....                               | <b>1</b> |
| <b>B) Course Structure</b> .....                              | <b>2</b> |
| <b>C) Learning Outcomes</b> .....                             | <b>2</b> |
| <b>D) Course Grading</b> .....                                | <b>4</b> |
| <b>E) Schedule of Class Sessions</b> .....                    | <b>5</b> |
| <b>F) Required Readings and Background Materials</b> .....    | <b>5</b> |
| <b>G) Responsibilities for All Participants</b> .....         | <b>5</b> |
| <b>H) Specific Responsibilities</b> .....                     | <b>6</b> |
| <b>I) Absences</b> .....                                      | <b>6</b> |
| <b>J) Classroom Dynamics and Expectations</b> .....           | <b>7</b> |
| <b>K) Academic Integrity</b> .....                            | <b>7</b> |
| <b>L) Accommodations for Students with Disabilities</b> ..... | <b>8</b> |

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**A) COURSE OVERVIEW**

This course addresses core ideas in sustainability science -- an emerging field of problem-driven research dealing with the interactions between human and environmental systems. The problem that motivates the course, and the field, is the challenge of sustainability: improving the well-being of present and future generations in ways that conserve the planet's life support systems over the long term. The goal of the course is to introduce students interested in sustainability science to the field's principle themes, cutting-edge findings, active debates and unresolved research questions. To this end, participants will critically discuss a set of presentations and papers covering the field in a systematic way, drawing on and integrating contemporary research from earth systems science,

resource economics, institutional analysis, ecology, geography, development studies, health sciences, engineering, and other disciplines.

## **B) COURSE STRUCTURE**

The course meets twice a week. The class is divided into student teams. All class members must read and be prepared to engage in the assigned reading topics addressed on Tuesdays. One team, however, will be responsible for leading an in-depth discussion of the readings, including pushing the topics in question beyond the readings per se. This lead may use ppt if appropriate. The other two teams are expected to engage the comments of lead team and to generate several questions posed to the instructors, made available by Wednesday noon. On Thursday, the instructors will lead with their version of topic of the week and answer the questions posed on Wednesday.

## **C) LEARNING OUTCOMES**

As a result of taking this class, the participants will gain the following:

1. Students will be able to understand the major approaches to measure sustainability at different scales from local to regional to global scales.
2. Students will be proficient in the concept of inclusive wealth and its applications.
3. Students will be able to understand the concepts of supply and demand of ecosystem services.
4. Students will be able to understand the relationship between stakeholder demand for ecosystem services and their values.
5. Students will understand the concepts of resilience and sustainability.
6. Students will comprehend the mathematical models that predict state transitions.
7. Students will comprehend the role of institutions in achieving sustainability at different scales.
8. Students will have hands-on experience analyzing examples of sustainability success and failures throughout human history.

## **D) COURSE GRADING**

Professors assume that all students wish to be here and are ultimately responsible for their own learning. Grades below a B are a very strong indication that the student is in trouble academically.

Assignment of letter grades is based on a percentage of points earned.

1. Participation in class 20 %
  2. Presentation of outline of final paper 15 %
  3. Final paper 65 %
- TOTAL 100%

The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

- A 100 – 91%
- B 90 – 81%
- C 80 – 71%
- D 70 – 61%
- E 60% and below

### E) SCHEDULE OF CLASS SESSIONS

| Date        | Topic                                                        |
|-------------|--------------------------------------------------------------|
| January 9   | Course Introduction/Framework                                |
| January 11  | Student paper ideas                                          |
| January 16  | Anthropocene and sustainability                              |
| January 18  | Anthropocene and sustainability                              |
| January 23  | Earth System Changes                                         |
| January 25  | Earth System Changes                                         |
| January 30  | Progress in Sustainability                                   |
| February 1  | Progress in Sustainability                                   |
| February 6  | Sustainability as sustainable development & inclusive wealth |
| February 8  | Sustainability as sustainable development & inclusive wealth |
| February 13 | Student Presentations                                        |
| February 15 | Student Presentations                                        |
| February 20 | Ecosystem Services                                           |
| February 22 | Ecosystem Services                                           |
| February 27 | Tipping Points/Planetary Boundaries                          |
| February 29 | Tipping Points/Planetary Boundaries                          |
| March 5     | <b>ASU Spring Break</b>                                      |
| March 7     | <b>ASU Spring Break</b>                                      |
| March 12    | Vulnerability and Resilience                                 |
| March 14    | Vulnerability and Resilience                                 |
| March 19    | Understanding Human Drivers of Earth System Changes          |
| March 21    | Understanding Human Drivers of Earth System Changes          |
| March 26    | Scenarios of sustainability                                  |
| March 28    | Scenarios of sustainability                                  |
| April 2     | World views and Sustainability Interpretations               |
| April 4     | World views and Sustainability Interpretations               |
| April 9     | Knowledge systems and action                                 |
| April 11    | Knowledge systems and action                                 |
| April 16    | Student identified topic                                     |
| April 18    | Student identified topic                                     |
| April 23    | Student Presentations                                        |
| April 25    | Student Presentations                                        |
| April 26    | Student Presentations                                        |

### F) REQUIRED READINGS AND BACKGROUND MATERIAL

All readings for the course are available on Canvas as articles or as part of the book, *The Anthropocene: 101 Questions and Answers for Understanding the Human Impact on the Global Environment*. This book is available via an electronic version available on Canvas.

### G) RESPONSIBILITIES FOR ALL PARTICIPANTS

**All participants** in the course are expected to do all of the work listed immediately below.

- a. **Attend all sessions** of the seminar, including the joint (Thursday) and local university (Tuesday) sessions. Participants who must miss a class should inform their lead faculty in writing in advance. Because this course is intended to accumulate knowledge as it proceeds, and to involve a lot of teamwork (see below), repeated absences are unfair to all.
- b. **Do all the assigned reading** for each week before the Tuesday class. Sustainability science is a complex, interdisciplinary field. We all – faculty and students – will find ourselves bewildered by some of the assigned readings that come far from our own fields of training. That means that “dumb questions” are fine. But comments or questions uninformed by a serious effort to grapple with the readings will impose an unfair burden on everyone.
- c. Participate actively in the **class discussions**.
- d. Engage in the assigned team rolls for the weeks topic.
- e. Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that violence and harassment based on sex is prohibited. An individual who believes they have been subjected to violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. Students can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>. As faculty are mandated reporters, we are obligated to report any information we become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html>.

## **H) SPECIFIC RESPONSIBILITIES**

Students taking the course must meet all the general requirements noted above.

In addition, each student must participate actively in the sessions of the course and complete a term paper.

**Term paper:** The purpose of this paper is to provide students with an opportunity to connect the themes of the course with the student’s own research or policy interests. Possible topics include: i) a proposal for research on a topic of human-environment interactions that engages relevant sustainability science theory; ii) a policy analysis of a particular sustainable development problem that uses relevant sustainability science to critique current practice and advance recommendations; iii) a critical review of the literature at the intersection of a particular substantive area and the relevant literatures of sustainability science; iv) another approach that meets the goal noted above that is proposed by the student and approved by the faculty. Students are invited to discuss possible paper topics with the faculty throughout the course.

Required submissions are:

- a. A **proposal** submitted by **mid-March**. This should include a tentative title; a narrative of 100-500 words on the topic to be addressed describing its importance and connection to sustainability science; and a list of 5-10 of the principal sources from the literature [not including those from the syllabus] that the author intends to utilize in preparing the paper. Faculty will return comments to the student on the proposal.

- b. A **final paper** submitted by **the end of classes**. This should be between 4000 and 8000 words, not including references, captions, tables and appendices.

#### **I) ABSENCES**

We expect all students to attend and to actively participate. This being said, life happens. If you are unable to attend class for any reason, please let the instructor know in advance. There will be no penalty for absences due to religious observances, research or academic activities (such as being away for a week to attend a conference for your dissertation), university sanctioned events/activities and genuine personal family emergencies (serious illnesses for you and/or your family). Every student will get one “no questions asked” absence. After this, they will be requested to provide some form of documentation. Unexplained or unwarranted absences will result in grades lost through the participation portion of the grade. There is no way to “make up absences” as each session is based around hands-on activities with your classmates. You will be expected to do readings for sessions you cannot attend as further sessions will refer back to previous ones.

#### **J) CLASSROOM DYNAMICS AND EXPECTATIONS**

This is a small, seminar style class. The only way that this works if everyone shows up on time and ready to work. It is expected that all readings will be done, and that all out of class activities will have been completed on time. Almost each class has an out of class or hands on activity related to it. Classroom discussions will be respectful and students will be asked to be considerate of their fellow students. Bullying will not be tolerated. Discrimination of any kind, including sexual discrimination, will not be tolerated. Faculty is obligated to report any information regarding alleged acts of sexual discrimination. Because the class is so small and we will be engaged in activities and/or discussion, We strongly discourage you from using cell phones in class. Laptops may be used for notetaking and at times a phone or recording device may be helpful for activities.

#### **K) ACADEMIC INTEGRITY**

Students are expected to be ethical not only in the classroom, but also out of the classroom. It is all students’ interest to avoid committing acts of academic dishonesty and to discourage others from committing such acts. Students should refrain from uploading any material that is not the student’s original work, unless the student complies with all applicable copyright laws. Faculty reserves the right to remove any and all materials if copyright infringement is suspected. Students should consult their instructors to seek clarification on what constitutes ethical behavior in and out of the classroom. There are several penalties including dismissal from the degree program for unethical behavior. Academic dishonesty includes, but is not limited to, the following examples: engages in any form of academic deceit; refers to materials or sources or uses devices (e.g., computer disks, audio recorders, camera phones, text messages, crib sheets, calculators, solution manuals, materials from previous classes, or commercial research services) not authorized by the instructor for use during any Academic Evaluation or assignment; provides inappropriate aid to another person in connection with any Academic Evaluation or assignment; engages in Plagiarism; uses materials from the Internet or any other source without full and appropriate attribution; claims credit for or submits work done by another; signs an attendance sheet for another student, allows another student to sign on the student’s behalf, or otherwise participates in gaining credit for attendance for oneself or another without actually attending; falsifies or misrepresents hours or activities in relationship to an internship, externship, field experience, workshop or service learning experience; or attempts to influence or change any Academic Evaluation, assignment or academic record for

reasons having no relevance to academic achievement. ASU expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. For more information on academic integrity, including the policy and appeal procedures, please visit <http://provost.asu.edu/academicintegrity>.

#### **L) ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

ASU's Student Accessibility and Inclusive Learning Services (SAILS) is the entity that provides services to students with disabilities. If you desire accommodation for this course, contact SAILS at <https://eoss.asu.edu/accessibility> to establish your eligibility and make sure they can provide you with the services you will need for this course. Students with disabilities must meet the same standards, deadlines, etc. as any other student in the course.