



Course Title: **Earth System Science**
Course Number: **ENV450**
Term: **Fall 2023**
Course Credits: **3**
Class Meeting Times: **Wed 1:30-4:00**
Class Location: **Wesselkamper 120**



Instructor Name: **Dr. Lupita Ruiz-Jones**
You can call me Dr. Lupita or Professor Lupita
Email: **guadalupe.ruiz-jones@chaminade.edu**
Office Location: **Wesselkamper 104**

Cell Phone (welcome to text, lmk who you are): **505.603.1985**
Office Hours: **Tues 12:00-2:30 (except on a few Tuesdays only until 1:00) / Wed 12:30-1:30 / Thur 12:00-2:30 / or we can schedule a meeting anytime!**
Office hours are in-person or zoom (zoom link in Canvas - text me to lmk you want to zoom)

*Images from NASA; figure from Steffen et al. 2020

Course description from University catalogue

Earth system science is a new and growing scientific sub-discipline that focuses on the causal connectedness and nature of the interactions between Earth's atmosphere, hydrosphere, lithosphere and biosphere. The course considers the particular interactions within Earth's natural system as well as anthropogenic alterations of it. Finally the course seeks solutions that synergize with or enhance the natural systems.

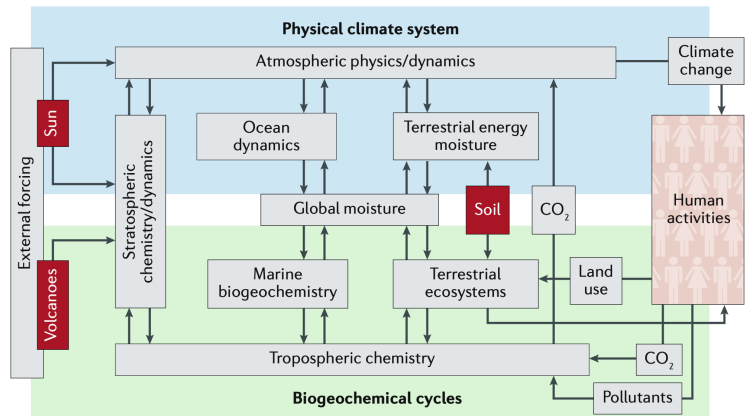


Fig. 2 | The NASA Bretherton diagram of the Earth System. The classical, simplified depiction of the Earth System and its interactions. The focus is on the interactions between the geosphere and the biosphere, with human forcings represented as an outside force affecting the geosphere–biosphere system.

Course overview

The learning goals of this class are two-fold. First to engage you in learning the foundational concepts of Earth System Science by reading the course texts and supplemental material focused on the geosphere, hydrosphere, atmosphere, biosphere, and anthroposphere. As you acquire this knowledge you will develop and practice skills used in data analysis and critique of scientific concepts presented in different types of sources. You will also think critically about how humans are altering the Earth System.



My teaching philosophy is that we will have a more engaging, and fun time, together if you come prepared. That means get the books (either buy your own copies, use the copies in the library, or borrow the student loaners from me), read the assigned sections prior to class, and practice critical thinking, which requires energy and is active. You will not enjoy your experience if you just show up without a clue of the day's topic and sit there expecting to be entertained without making any contribution.

Service learning requirement

Through participation in organized service learning activities you will discover the many disciplines and techniques involved in ameliorating environmental challenges; and see how we put our skills and our Marianist and Pacific Island values into action for the good of the community.

Alignment of Natural Sciences Courses with Marianist and Hawaiian values

The Natural Sciences Division provides integrative course content taught by experienced, dedicated, and well-educated instructors. *We educate in the family spirit* – every classroom is an *Ohana* (family) and you can expect to be respected yet challenged in an environment that is supportive and inclusive by instructors who take the time to personally get to know and care for you. *We educate for service, justice and peace*, because many of the most pressing global issues (climate change, health inequity, poverty, justice) are those which science and technology investigate, establish ethical parameters for, and offer solutions to. *We educate for adaptation and change*. In science and technology, the only constant is change. Data, techniques, technologies, questions,

interpretations, and ethical landscapes are constantly evolving, and we teach students to thrive on this dynamic uncertainty.

The study of science and technology is formative: exploring human creativity and potential in the development of technologies and scientific solutions; engaging in the stewardship of the natural world; and, promoting social justice. We provide opportunities to engage with the problems that face Hawai'i and the Pacific region through the Natural Sciences curriculum, in particular, those centered around severe



challenges in health, poverty, environmental resilience, and erosion of traditional culture. The Marianist Educational Values relate to Native Hawaiian ideas of *mana* (spiritual energy of power and strength), *na'auao* (wisdom, enlightenment), *ohana*, *aloha* (love, affection, generosity, speaking from the heart, patience, and listening) and *aina* (love for the land and its people). We intend for our Natural Sciences programs to be culturally-sustaining, rooted in our

Hawaiian place, and centered on core values of *Maiau*, be neat, prepared, careful in all we do; *Makawalu*, demonstrate foresight and planning; *`Ai*, sustain mind and body; *Pa`a Na`au*, learn deeply.

Environmental Science Program Learning Goals

This course is part of the Environmental Science program. These are the Program Learning Outcomes for the program.

Upon completion of the undergraduate B.S. program in Environmental Science, students will be able to:

1. Authenticate their commitment to service, justice and peace through experiential project-based activities that enhance the condition of the integral ecology, care for creation and value all voices.
2. Apply scientific reasoning and methodology to environmental problems.
3. Identify the major physical, chemical and biological components, interactions and cycles of earth systems and ecosystems.
4. Propose, design and participate in scientific research projects that document, describe and/or help solve environmental problems and foster sustainability.

5. Pursue throughout their education new scientific knowledge and techniques that prepare them for the adaptation and change essential to environmental problem solving.

Course Learning Outcomes and their evaluation

By the end of the course, you will be able to:

1. Demonstrate ability to describe the major concepts used to characterize the geosphere, hydrosphere, atmosphere, biosphere, cryosphere, and anthroposphere.
 - a. Satisfies Program Learning Outcome 3.
 - b. Evaluated via quizzes, in-class/online discussions, and Final Popular Science Article Project.
2. Effectively read scientific literature with a critical and analytical mindset and evaluate how science is presented in secondary sources.
 - a. Evaluated via in-class/online discussions and Final Popular Science Article Project.
3. Communicate clearly and concisely the significance of a central Earth System topic.
 - a. Satisfies Program Learning Outcome 3 and 5.
 - b. Evaluated via your Final Popular Science Article Project.
4. Authenticate [your] commitment to service, justice and peace through experiential project-based activities that enhance the condition of the integral ecology, care for creation and value all voices.
 - a. This is Program Learning Outcome 1
 - b. Accomplished via Class Service Learning Project

Class Discussions

A goal of this course is to gain experience reflecting on and discussing scientific material with me and your peers. We will have **weekly** discussions based on the assigned reading (from two course books and supplemental articles). Discussions are a great opportunity to reflect on what you read, what new ideas/concepts you learned, and think about questions. Discussions are also great opportunities to practice speaking up in class and sharing your perspective.

Data Analysis Workshops

As we read the course texts and articles we will also spend time looking closely at data graphs and databases. There will be times when I provide you with data visuals and you

will be asked to interpret and ask questions of the data. Other times we will explore online databases and you will identify patterns and trends.

Book Club Team Discussions

You will work in small groups to facilitate class discussion for one of the assigned book chapters. This will involve finding related scientific and popular science articles, doing supplemental background research on the topic to increase understanding, and facilitating class discussion.

Final Popular Science Article Project

The goal of the class final project is to present an environmental phenomenon or challenge and explain its connection to an Earth System Science concept in a way that is accessible to a wide audience. As you read the two course books you will start to make observations on how to effectively communicate complex scientific information to an educated audience. In your Final popular science article you will explain a complex earth system concept and present ideas for future research directions to understand/address the phenomenon/challenge. You will explain the science and present the research needs to a wide audience, hence the popular science angle and the connection to the writing styles in the two course books. There will be multiple checkpoints throughout the semester to update me on progress you are making and receive feedback from your peers.

See Canvas Modules for the tentative schedule

Grading breakdown

* The grade listed in Canvas is NOT accurate because it does not include all components of your final grade. If you are ever curious about your grade ASK ME :)

5% = Attendance (roll call in Canvas)

5% = Engaged participation with peers, me, and guests (requires arriving to class prepared)

- Includes participation in **class discussions**.
- To earn an A involves:
 - Regularly asking questions and responding to questions.
 - Being prepared to share your thoughts on the material assigned for class discussion.
- To earn a C involves:
 - Being present.
 - Demonstration of lack of preparedness for discussions.

15% = Canvas discussion posts

- How I will assess your reading comprehension.
- The discussion posts are a great way to prepare to engage in class discussions and also are helpful for preparing for quizzes. These are not accepted late because they are meant to prepare you for class discussion.
- Reflections on class presentations and guest visits.

10% = Book Club Team Discussion Project: facilitate critical review of book chapter

25% = Quizzes (multiple throughout the semester)

30% = Final Popular Science Project

- Breakdown:
 - 5% = Annotated Bibliography Version 1
 - 5% = Annotated Bibliography Version 2
 - 5% = Outline
 - 5% = Version 1 of popular science article
 - 10% = Final version of popular science article

10% = Class Service Learning Project and reflections on Presence. Some activities will be completed during class. Also required to attend two Saturday morning events with Kuilei Cliffs (8am-12pm, lunch provided). Van transportation from campus will be provided.

Late work policy

This policy applies to components of the major assignments: Journal Club Presentation, Quizzes, Final Popular Science Project. If something happens and you know you need an extension on an assignment, contact me. If we do not make a prior arrangement, 10% of the assignment points will be deducted for each day after the assignment due date. Generally canvas discussion posts are not accepted late.

A = Outstanding scholarship and an unusual degree of intellectual initiative

B = Superior work done in a consistent and intellectual manner

C = Average grade indicating a competent grasp of subject matter

D = Inferior work of the lowest passing grade

F = Failed to grasp the minimum subject matter; no credit given

Extra credit opportunities

Throughout the course I will notify you of opportunities to engage with ideas and scholars outside of Chaminade. Most of these opportunities will be webinars. You are also welcome to attend any other webinar you find on your own that is related to course material.

Other extra credit opportunities are to participate in community service events with community environmental organizations. In class check in with me about the opportunity and the time commitment.

A place to look for community service opportunities:
<http://www.conservationconnections.org/>

To receive credit for extra credit you will need to submit a reflection on Canvas for each webinar/activity you participate in. There are specific criteria for your reflection on Canvas in the Extra Credit Discussion Assignment. **Each extra credit submission will be applied to your quiz grade or to make up for a missed Canvas post. Max accepted will be 3 extra credit opportunities.**

Workload expectations

Students are expected to devote a minimum of 2 hours of focused work out of class for each 1 hour of class time per week. This equates to a minimum of 5 hours of outside focused work per week.

Attendance and your grade

As an enrolled student in the course, I expect that you will attend every class unless you are sick. **If you have more than two unexcused absences your grade will be negatively impacted.** An important aspect of learning is active engagement. There is no substitute for being in class when it comes to understanding and thinking critically about the material. Unexcused absences occur when playing hooky to go surfing, to sleep, to cram for an exam in another class, etc.

Credit Hour Policy

The unit of semester credit is defined as university-level credit that is awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in a minimum of 45 hours of engagement, regardless of varying credits, duration, modality, or degree level. This equates to one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester. Terms that have alternative lengths, such as 10 week terms, should have an equivalent amount of faculty instruction and out-of-class student work to meet each credit hour. Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit. The number of engagement hours may be higher, as needed to meet specific learning outcomes.

Specific Credit Situations

The minimum 45 hours of engagement per credit hour can be satisfied in fully online, internship, or other specialized courses through several means, including (a) regular online instruction or interaction with the faculty member and fellow students and (b) academic engagement through extensive reading, research, online discussion, online quizzes or exams; instruction, collaborative group work, internships, laboratory work, practica, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

- ENV450 is a 3 credit class requiring a MINIMUM of 135 clock hours of student engagement, per the official CUH Credit Hour Policy.
- We will meet once a week: 2h 30min each week = ~37.5h for 15 weeks
- You will have reading and short writing assignments that are expected to take you ~2.5h per week (37.5h).
- Preparing for your Book Club Team Discussion Project is expected to take you ~10h.
- You will have 3 quizzes that will take you ~8h to study for = 24h.
- For your Final Popular Science Project you will spend time researching, drafting, giving feedback, and revising. This is expected to take you ~27h.
- It is expected that completing the class service learning project will take you ~8h.

Course website

We will use Canvas and google drive.

Required course texts

The story of earth: the first 4.5 billion years, from stardust to living planet by Robert Hazen (2013) - PAPERBACK

https://www.amazon.com/Story-Earth-Billion-Stardust-Living/dp/0143123645/ref=asc_df_0143123645/?tag=hyprod-20&linkCode=df0&hvadid=312091458201&hvpos=&hvnetw=g&hvrand=3289969889870508636&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9022865&hvtargid=pla-470469081521&psc=1&tag=&ref=&adgrpid=63669393113&hvpone=&hvptwo=&hvadid=312091458201&hvpos=&hvnetw=g&hvrand=3289969889870508636&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9022865&hvtargid=pla-470469081521

- ISBN-10 : 0143123645
- ISBN-13 : 978-0143123644

The Emerald Planet: How plants changed earth's history by David Beerling (2007)
HARDCOVER - (Illustrated edition)

<https://www.amazon.com/gp/product/B00DU7OYM0?ie=UTF8&camp=1789&creativeASIN=B00DU7OYM0&linkCode=xm2&tag=smithsonianco-20>

- ISBN-10 : 0192806025
- ISBN-13 : 978-0192806024

Classroom atmosphere

Learning through discussion

In class and online discussions provide an excellent opportunity to learn from classmates; to formulate and rethink your own understanding of the material; to practice thinking on your feet; and to critically evaluate evidence.

Over the semester, you will develop your skills in:

- ❖ Engaging substantively with different types of sources in critical and productive ways
- ❖ Posing thought provoking questions and collaborating with peers
- ❖ Effectively communicating your ideas, both orally and in writing

Expectations of students in class

You have the responsibility to commit yourself to your academic work in ways that will increase your learning. In this course, following the guidelines below will give you the best chance of growing as a critical thinking learner:

Arrive to every class on time, which means settled in your seat by the start time.

Approach the work of the course with the habits of mind critical for success at the university level: intellectual curiosity, critical engagement, and creativity.

Prepare by doing all the required reading and assignments before class. Feel free to bring printed copies of articles or notes you took while reading to guide you during discussions.

Listen actively and with respect to your peers. We listen to each other with dignity by thoughtfully grappling with the ideas of others and using non-verbal cues to show we are paying attention to them. Active listening is essential to engaged participation.

Speak up and challenge yourself to share your thoughts and ideas with your classmates in skillful and respectful ways. Being critical of your peers is essential for proper academic discourse, but we strive to do so respectfully. Since you are thinking on your feet, you are not expected to speak with perfect clarity. Class discussion is a cooperative enterprise, not a competition. A quality contribution is one that helps stimulate our learning. A thoughtful response to another student's comment leads to a much richer learning experience than a long and well-researched but disconnected comment.

Inquire by asking questions—this is a key aspect of learning. Ask yourself questions as you engage with the course material. Engage with your peers by asking questions. Often there is not a single “right” answer.

Expectations you can have of me

I will continually strive to be an engaging, thoughtful, and critical teacher. One of my primary goals is to create a learning environment where everyone feels included. You can expect me to make space for you to share your thoughts and questions. You can also expect me to listen to your feedback on how the class is going -- please share your observations and ideas with me.

Technical Assistance for Canvas Users:

- Search for help on specific topics or get tips in [Canvas Students](#)
- [Live chat with Canvas Support for students](#)
- Canvas Support Hotline for students: +1-833-209-6111
- Watch this [video to get you started](#)
- [Online tutorials](#): click on “Students” role to access tutorials
- Contact the Chaminade IT Helpdesk for technical issues:
helpdesk@chaminade.edu or call (808) 735-4855

Tutoring and Writing Services

Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help is available on campus at Kōkua ‘Ike: Center for Student Learning in a variety of subjects (including, but are not limited to: biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check [Kōkua ‘Ike’s website](#) for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via TutorMe. Tutor Me can be accessed 24/7 from your Canvas account. Simply click Account – Notifications – TutorMe. For more information, please contact Kōkua ‘Ike at tutoring@chaminade.edu or 808-739-8305.

Course Policies

Communication with me

I'm always happy to address your questions. I generally answer emails within 24 hours on weekdays and by the following weekday if sent on a weekend or holiday. Please do not wait until the last minute to ask questions. I expect you to communicate with me about any issues related to the course. Clear and timely communication can anticipate many standard problems that arise during a course. I am also super happy to just chat with you about topics you find interesting or you are curious about.

Grades of "Incomplete"

You may negotiate an incomplete grade with me when there are specific justifying circumstances. When submitting a grade the "I" will be accompanied by the alternative grade that will automatically be assigned after 90 days. These include IB, IC, ID, and IF. If only an "I" is submitted the default grade is F. The completion of the work, evaluation, and reporting of the final grade is due within 90 days after the end of the semester or term; this may not be extended.

Cell phones, tablets, and laptops

Out of consideration for your classmates, please set your cell phone to silent mode during class. Students are encouraged to bring laptops or tablets to class as I will at times assign online activities and readings that will require the use of a laptop or tablet. It is well known that these devices can be extremely distracting to your learning as well as the learning experience of your peers. When you are in class I expect that you are focused on the material and not multitasking by checking email, social media, or unrelated material on your device.

Disability Access

If you need individual accommodations to meet course outcomes because of a documented disability, please speak with me to discuss your needs as soon as possible so that we can ensure your full participation in class and fair assessment of your work. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from the Counseling Center by the end of week three of the class, in order for instructors to plan accordingly. If a student would like to determine if they meet the criteria for accommodations, they should contact the Kōkua 'Ike Coordinator at (808) 739-8305 for further information (ada@chaminade.edu).

Title IX Compliance

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. If you or someone you know has been harassed or assaulted, you can find the appropriate resources by visiting Campus Ministry, the Dean of Students Office, the Counseling Center, or the Office for Compliance and Personnel Services.

Attendance Policy

For the University wide attendance policies please see the 2020-2021 Academic Catalog.

You are expected to regularly attend all courses for which you are registered. You should notify me when illness or other extenuating circumstances prevent you from attending class and make arrangements to complete missed assignments. Notification may be done by emailing me. It is my prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially withdrawing may receive a failing grade.

Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being withdrawn from the course, although I am not required to withdraw students in that scenario. Repeated absences put students at risk of failing grades.

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu ADA Coordinator may be considered for an exception when the accommodation does not materially alter the attainment of the learning outcomes.

Federal regulations require continued attendance for continuing payment of financial aid. When illness or personal reasons necessitate continued absence, you should communicate first with me to review the options. Anyone who stops attending a course without official withdrawal may receive a failing grade or be withdrawn at my discretion.

Academic Conduct Policy

Students should conduct themselves in a manner that reflects the ideals of the University. This includes knowing and respecting the intent of rules, regulations, and/or

policies presented in the Student Handbook, and realizing that students are subject to the University's jurisdiction from the time of their admission until their enrollment has been formally terminated. Please refer to the Student Handbook for more details. A copy of the Student Handbook is available on the Chaminade website.

This syllabus and course schedule are living documents: they are free to change. I try to adhere as closely as possible, but there will be times in which we will take longer on a particular topic or add or delete a topic to enhance the course. I like to be able to react to you as the course proceeds and go with the flow a bit in order to make the course experience sort of custom fit to you!

You are responsible for all of the information in this document: not reading it does not make you exempt from knowing what's in it!

Use this syllabus to keep you organized and aware of important dates and how your grade is determined.