FACULTAD DE CIENCIAS E INGENIERÍA

CONSERVATION IN THE PERUVIAN AMAZON
2024-2

I. INFORMACIÓN GENERAL

CURSO	CONSERVATION IN THE PERUVIAN AMAZON
CLAVE	1ING13
CRÉDITOS	3
HORAS DE DICTADO	CLASE: 2 Semanal LABORATORIO: 2 Semanal
HORARIO	TODOS
PROFESORES	GEOFFREY RENE GALLICE

II. PLANES CURRICULARES DONDE SE DICTA EL CURSO

ESPECIALIDAD	ETAPA	NIVEL	CARÁCTER	REQUISITOS
INGENIERÍA CIVIL	PREGRADO EN FACULTAD	0	ELECTIVO	CIV229 FUNDAMENTOS DE INGENIERÍA AMBIENTAL [07]
INGENIERÍA AMBIENTAL Y SOSTENIBLE	PREGRADO EN FACULTAD	0	ELECTIVO	CIV229 FUNDAMENTOS DE INGENIERÍA AMBIENTAL [07]

Tipos de requisito

04 = Haber cursado o cursar simultáneamente
05 = Haber aprobado o cursar simultáneamente
06 = Promedio de notas no menor de 08
07 = Haber aprobado el curso

III. DESCRIPCIÓN DEL CURSO

This course will provide students with an overview of the biodiversity and human geography of the Peruvian Amazon, the conservation challenges facing the region, and the strategies being employed to sustainably manage Amazonian natural resources in Peru, with a particular focus on the southeastern region of Madre de Dios.

We begin with a survey of biodiversity in the Peruvian Amazon¿the number and variety of species, biological communities, and ecosystems present in the region, as well as their distribution. This module will also include an outline of the historical and evolutionary factors that underlie this diversity, which is unmatched anywhere on Earth. In the second module we will explore the region¿s human history, including its current cultural layout, and what this has meant for biodiversity and other natural resources in Peru. Major topics will include the building of roads and other major infrastructure, the extraction of resources such as gold and timber, and the expansion of the agricultural frontier. In the third and final module, we will examine the strategies being employed by both the private and public sectors to conserve biodiversity and other Amazonian natural resources, as well as to promote sustainable development.

Upon completion of the above classroom-based modules at the PUCP campus in Lima, students will travel to Madre de Dios for in situ instruction and hands-on activities to reinforce key concepts and learning objectives. We will spend time at an active research station, Finca Las Piedras, where students will learn about and participate in conservation-focused activities related to research, environmental education, and direct conservation action (e.g., reforestation).

This course will be taught in English, in both the classroom and in the field, integrating both traditional learning techniques and hands-on activities that will drive home key points. The goal is for students to finish the course with a broad understanding of the challenges and opportunities provided by the rapid change currently affecting the Amazon region, so that they can later apply this knowledge as leaders and decision makers in environmental fields in Peru or elsewhere.

IV. SUMILLA

This is an elective course of theoretical and practical nature, which contributes to student outcomes 2, 3, 4 and 7 of the civil engineering program. It will provide students with an overview of the biodiversity of the Peruvian Amazon, the conservation challenges facing the region, and the strategies being employed to sustainably manage Amazonian natural resources. This course will be taught in the classroom and in the field, integrating both traditional learning techniques and hands-on activities that will emphasize key points. The goal is for students to finish the course with a broad understanding of the challenges and opportunities provided by the rapid change currently affecting the Amazon region, so that they can later apply this knowledge as leaders and decision makers in environmental fields.

V. OBJETIVOS

Upon completion of the course, the student will be able to:

-Understand the origins and current distribution of biodiversity and ecosystems in the Peruvian Amazon
-Know the importance of biodiversity to the functioning of ecosystems and the provision of ecosystem services
-Identify the threats to biodiversity and other natural resources in Amazonian Peru, as well as the impacts of their loss on human communities
-Understand the strategies being employed by the private and public sectors to conserve and sustainably manage Amazonian natural resources
-Apply knowledge and skills gained to solving conservation challenges through research in the field
-Interact with students from other disciplines with the aim of fostering interdisciplinary discussion and learning

This course supports the following student outcomes of the approved Civil Engineering Curriculum:

(1) The ability to identify, formulate, and solve complex engineering problems through the application of engineering, science, and mathematical principles.
(6) The ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgments to draw conclusions.
(2) The ability to apply engineering design to produce solutions that meet specific needs taking into account public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
(5) The ability to perform effectively in a team whose members collectively provide leadership, create a collaborative and inclusive environment, set goals, plan tasks, and accomplish objectives.
(4) The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and social contexts.
(3) The ability to communicate effectively with a range of audiences.
(7) The ability to acquire and apply new knowledge, as needed, using appropriate learning strategies.
(2.2) Applies engineering design to design systems, components, or processes, taking into account all relevant requirements and constraints
(6.2) Develop the experiment
(8) Project Management: The ability to demonstrate knowledge and understanding of the principles of engineering management and economic decision making, and their respective application.

VI. PROGRAMA ANALÍTICO

CAPÍTULO 1 INTRODUCTION (10 horas)

1.1 Module 1: Introduction to the Amazon: Origins and contemporary distribution of biodiversity and ecosystems in the Andes-Amazon region (2 hrs)
1.2 Historical and current cultural layout of Peru¿s Madre de Dios region (2 hrs)
1.3 Conservation challenges & human implications in Madre de Dios (2 hrs)
1.4 Conservation strategies part I: National protected areas (2 hrs)
1.5 Conservation strategies part II: Filling in the gaps (2 hrs)

CAPÍTULO 2 PRACTICUM & CASE STUDIES IN CONSERVATION (32 horas)

2.1 Biodiversity of SE Peru
2.1.1 Insect diversity & sampling techniques
2.2 Studying biodiversity in the field: Overview
2.2.1 Basic biodiversity research: Goals & methodologies
2.2.1.1 Butterfly diversity, natural history & life stages
2.2.1.2 Rainforest mammal diversity & occupancy: Camera trapping
2.3 Understanding the impacts of infrastructure and development on biodiversity
2.3.1 Road impacts - Manu Road and Interoceanic Highway case studies
2.4 Carbon storage of Amazonian forests & climate change
2.4.1 Techniques for estimating living aboveground biomass
2.4.2 Comparison of carbon storage across space & in different Amazonian habitat types
2.5 Survey of conservation strategies in Madre de Dios
2.5.1 Forest protection
2.5.2 Reforestation
2.5.3 Research
2.5.4 Education

VII. METODOLOGÍA

Lectures during the first week of the course will be taught in Lima, and the remainder of the course will be held at Finca Las Piedras in Madre de Dios, Peru. Students will be expected to complete readings before each classroom session in Lima on the date listed in section VII above, as well as before select activities conducted in the field (see Section VI-2). Several activities will require homework and post-activity reports. A final exam will test students¿ synthesis of the material covered over the duration of the course.

Attendance to all classes is highly recommended, and students are highly encouraged to participate when appropriate, e.g., during group discussions, answering questions posed to the class, etc.

VIII. EVALUACIÓN

Sistema de evaluación

N°	Codigo	Tipo de Evaluación	Cant. Eval.	Forma de aplicar los pesos	Pesos	Cant. Eval. Eliminables	Consideraciones adicionales	Observaciones
1	Nf	Nota Unica	1	Por Evaluación	Nf1=1			

Modalidad de evaluación: 4

Fórmula para el cálculo de la nota final

(1Nf1) / 1

Aproximación de la nota final No definido

Consideraciones adicionales

Type 4 Evaluation will be conducted in this course, calculating the average final grade based on the following equation:

Final grade = (GA1 + GA2 + GA3 + FE) / 25
where:
GA = Group activity
FE = Final exam

Assessment item Points possible
Group activity 1: 100
Group activity 2: 100
Group activity 3: 100
Final exam: 200

Course total points possible: 500

IX. BIBLIOGRAFÍA

Referencia obligatoria

- Artículo / Journal
  Anderson, J.L.
  2016
  An isolated tribe emerges from the rain forest
  https://www.newyorker.com/magazine/2016/08/08/an-isolated-tribe-emerges-from-the-rain-forest
- Artículo / Journal
  Edwards, D.P., Socolar, J.B., Mills, S.C., Burivalova, Z., Pin Koh, L., & D.S. Wilcove
  2019
  Conservation of Tropical Forests in the Anthropocene
  https://www.cell.com/current-biology/pdf/S0960-9822(19)31075-9.pdf
- Libro
  Gallice, G. R., Larrea-Gallegos, G., & Vázquez-Rowe, I.
  2019

The threat of road expansion in the Peruvian Amazon
Oryx, 53(2), 284-292.

- Libro
  Kricher, John C.
  2017
  The new neotropical companion.
  New Jersey : Princenton University Press
  Chapters 1, 2, & 9 in:
- Artículo / Journal
  Laurance, W.F
  2005
  When bigger is better: The need for Amazonian mega-reserves
  https://www.sciencedirect.com/science/article/abs/pii/S0169534705003319
- Artículo / Journal
  Wallace, S.
  2013
  Mahogany's Last Stand
  https://www.yumpu.com/en/document/read/52410839/mahoganys-last-stand-scott-wallace
- Artículo / Journal
  Webster, D.
  2012
  The devastating costs of the Amazon gold rush
  https://www.smithsonianmag.com/travel/the-devastating-costs-of-the-amazon-gold-rush-19365506/

X. CRONOGRAMA

SEMANA	CONTENIDO POR SEMANA	
CAPÍTULO 1	**INTRODUCTION**	**Actividad**
1	PUCP (Lima). March 18: Introduction to the Amazon: Origins and contemporary distribution of biodiversity and ecosystems in the Andes-Amazon region. Lectura: Chapters 1, 2, & 9 in: Kricher, J. 2017. The new neotropical companion. Princeton University Press, Princeton	
2	PUCP (Lima). March 19: Historical and current cultural layout of Peru's Madre de Dios region. Lectura: Anderson, J.L. 2016. An isolated tribe emerges from the rain forest. The New Yorker.	
3	PUCP (Lima). March 20: Conservation challenges & human implications in Madre de Dios Lectura: Webster, D. 2012. The devastating costs of the Amazon gold rush. Smithsonian Magazine, February 2012. Wallace, S. 2013. Mahogany's last stand in National Geographic April 2013, pp. 112-127.	
4	PUCP (Lima). March 21: Conservation strategies part I: National protected areas Lectura: Laurance, W.F. 2005. When bigger is better: The need for Amazonian mega-reserves. Trends in Ecology and Evolution 20: 645-648.	

5	PUCP (Lima). March 22: Conservation strategies part II: Filling in the gaps Lectura: Edwards, D.P., Socolar, J.B., Mills, S.C., Burivalova, Z., Pin Koh, L., & D.S. Wilcove. 2019. Conservation of tropical forests in the Anthropocene. Current Biology 29.	
11	March 23. LIM - PEM - Finca Las Piedras.	Travel LIM-PEM-Finca Las Piedras PM: Introduction to Finca Las Piedras, risk management briefing
12	March 24. Finca Las Piedras.	AM: Introductory rainforest hike Group discussion-ASA research, reforestation, & education projects PM: Group Activity #1-Set up camera traps
13	March 25. Finca Las Piedras. Lectura: Gallice et al. 2019 - The threat of road expansión in the Peruvian Amazon	AM: Group activity #2-Aboveground biomass estimation PM: Reading discussion - Roads in the Amazon
14	March 26. Finca Las Piedras Lectura: Group activity #3 report due	AM: Birding AM & PM: Group activity #3-Amazon insect diversity
15	March 27. Finca Las Piedras. Lectura: Group activity #1 report due Group activity #2 report due Final exam	AM: Butterfly diversity & natural history PM: Group activity #1-Collect & review camera traps
CAPÍTULO 2	**PRACTICUM & CASE STUDIES IN CONSERVATION**	**Actividad**
16	March 28. Finca Las Piedras - Lago Sandoval.	AM: Travel to Lago Sandoval, Tambopata National Reserve
17	March 29. Lago Sandoval - Pto. Maldonado	AM: Lago Sandoval, Tambopata National Reserve PM: Return to Pto. Maldonado
18	March 30. PEM - LIM	Travel PEM-LIM

XI. POLÍTICA CONTRA EL PLAGIO

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