



CIEE in Monteverde, Costa Rica

Course name:	Independent Research in Biology/Ecology
Course number:	BIOL 3002 MVCR / ECOL 3002 MVCR
Programs offering course:	Costa Rica: Monteverde - Tropical Ecology & Conservation
Language of instruction:	English
U.S. Semester Credits:	4 semester/6 quarter hours
Contact Hours:	60 hours
Term:	Fall 2018
Course meeting times:	Tuesdays and Thursdays 9:00-10:30 am and scheduled fieldtrips
Course meeting place:	Classroom, Monteverde Biological Station
Professor:	Alan R. Masters, PhD, Johel Chaves-Campos, PhD
Contact Information:	Office phone 2645-5539, amasters@ciee.org
Office address:	CIEE Office, Monteverde Biological Station
Office hours:	Tuesdays 1-3 pm

Course Description

Students develop a research proposal and carry out an investigation in tropical ecology, agriculture, sustainable development, or environmental education. The project will reflect the student's interest and will be agreed upon by the student and an advisor. The project includes making initial observations and building them into testable hypotheses, selecting the appropriate experimental design and statistics, writing the research proposal, collecting appropriate data, submitting two written manuscripts formatted for publication, reviewing a peer's manuscripts, and presenting results in a scientific symposium open to the Monteverde community.

Learning Objectives

- Design and conduct an original research project
- Develop experience with field techniques in tropical ecology
- Review and practice basic principles of experimental design and statistics
- Critique a scientific manuscript
- Develop skills of scientific writing
- Communicate research findings with others

Course Prerequisites

One year Introductory Biology and one semester of whole organismic biology, conservation or environmental science.



Methods of Instruction

- Students will develop (with guidance) a research project proposal that will provide initiative, outline an experimental strategy, and serve as a request for funding of consumable supplies from the program.
 - Each student will present oral reports of research progress, relevant readings, and/or challenges with advisors.
- Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments.
- Students will produce a manuscript (with active feedback from their advisor and peers) that can be published in a CIEE book and appropriate research journal. Publishable manuscripts require many drafts, reviews, and two formal submissions.
- Students will be self-motivated and work independently, approaching the advisor for guidance regularly.

Assessment and Final Grade

- 10% - Project Proposal
- 40% - First submission of manuscript
- 30% - Final paper (formatted according to scientific journal style)
 - 5% - Peer review
- 10% - Symposium presentation
 - 5% - Participation

Course Requirements

Project Proposal

Students will use relevant scientific publications to research and justify a study question, develop supporting methods and consider the significance of various outcomes in the form of a formal, written proposal. This proposal will be 3-5 pages in length and include: Title, Introduction, Methods, Preliminary Results, Anticipated Results and Literature Cited.

First Submission of Manuscript

A fully formatted version of the project ready to be submitted to *Biotropica*, the scientific journal of the Association for Tropical Biology and Conservation. This will be 5-7 pages in length and will contain: Title, Introduction, Materials and Methods, Results (with appropriate statistics, figures and tables), Discussion and Literature Cited.

Final Paper

As above, but addressing comments from advisor and peer review. Evaluation will be based on the overall quality of the manuscript at this stage.



Peer Review

Students will be evaluated on the level of depth critiquing a fellow student's first submission. Correcting typos will be awarded 1 point, grammar 2 points, broad suggestions 3 points, broad and specific suggestions that improve the manuscript 4 points, insightful comments that significantly improve the manuscript 5 points.

Symposium Presentation

An oral presentation of the experimental results in the form of a Powerpoint presentation will be given during a student symposium. Talks of 8-10 minutes duration will include Title, Introduction, Materials and Methods, Results (including appropriate figures, tables and statistics) and Discussion (with general conclusions). Questions will follow and students will be evaluated on their ability to address them.

Participation

Evaluation is based on the degree of commitment to the project, the ability to balance independence while seeking help when needed, care in setting up the project, quality of the data and other observations, experimental insight and care in cleaning up after the project. The expectation for data collection is no less than 4 hours per day for 20 days, or a total of 80 hours in the field, plus time collating, analyzing, constructing figures and all other components.

Weekly Schedule

List your schedule of classes below for the full term, including orientation, holidays and scheduled program trips. Ask the Resident Director for program dates before scheduling classes. If there are required course related fieldtrips in addition to regularly scheduled classes, be sure to indicate that these are required.

Weeks 1-2: Field Trip – Introduction, immersion, group field projects and presentations

Week 3: Project Meetings in Groups, group field projects and presentations

Week 4: Individual meetings with staff, brainstorming activities.

Week 5-6: Field Trip – Immersion, group and individual discussions of project ideas, group projects and presentations.

Week 7: Proposal writing, gathering supplies, setting up experiments. Experimental Design lecture.

Weeks 8-11: Data collection in the field. Statistics lecture.

Week 12: Data entry, statistics, analysis, figures and tables. How to Write Manuscript lecture.



Week 13: First submission, symposium talk, peer review, How to Make a Symposium Talk lecture.

Week 15: Final submission of manuscript.

Readings

Ambrose III, H.W., K. P. Ambrose, D. J. Emlen and K. L. Bright. 2007. A Handbook of Biological Investigation 7th edition. Hunter Textbooks, Inc. Winston Salem, N.C.