JOHN A. LOGAN COLLEGE N. Hinckley – SM 09

BIO 241 INTRODUCTION TO TROPICAL ECOLOGY 3 cr. (2-2)

COURSE DESCRIPTION:

A travel-study course providing baccalaureate transfer students an introduction to tropical ecology. Tropical forests, deserts, savannas, freshwater marine habitats, and the human impact on these areas are explored through readings, lectures, videos, and fieldwork in a tropical location. On-campus assignments include a seminar before and after the trip and weekly assignments during the semester.

PREREQUISITES: None

COURSE OBJECTIVES:

To enable students to contrast tropical and temperate habitats; employ ecological methods, including species identification; and explore ways that a human population may have sustainable development in a tropical area.

1. Identify tropical countries.
2. Locate on maps, countries with tropical deserts, tropical rain and deciduous forests, cloud forests, and savannas.
3. Identify 75 species of organisms in the tropical study area.
4. Discuss consequences and identify factors stimulating rain forest destruction, and develop proposals for sustainable forest use.
5. Describe symbiotic relationships of organisms in tropical study area.
6. Contrast tropical rain forest soils and temperate rain forest soils.
7. Demonstrate behavior acceptable to local population and travel safety in the tropical study area.
8. Observe and describe mangrove ecology in the study area.
9. Compare fresh and marine water using chemical tests and measurements.
10. Describe reef ecology, locate major coral reefs of the world, and identify reef organisms while exploring a live coral reef.
11. Identify past and present cash crops in the study area and propose possible sustainable development.
12. Write a five to ten page referenced paper demonstrating knowledge of the ecological relationships of one or more organisms observed in the tropical study area and give a presentation to course participants on material obtained in preparing the research paper.

COURSE OUTLINE:

UNIT 1. INTRODUCTION TO TROPICAL AREAS
1.1 Location of tropical areas*
1.2 Climate*
1.3 Temperature*

UNIT 2. ECOLOGICAL PRINCIPLES
2.1 Environment, cycles, inhabitants*
2.2 Natural world and its diversity*
2.3 Natural history, relationships between organisms*

UNIT 3. TROPICAL STUDY AREA OVERVIEW
3.1 Geographic location*
3.2 Climate*
3.3 Human population*
3.4 Traveler's health concerns
3.5 Bird species identification
3.6 Tour of tropical area*
3.7 Morning bird walk*
3.8 Natural history of islands*
3.9 Evening bird walk*

UNIT 4. TROPICAL FORESTS AND TROPICAL SAVANNAS
4.1 Tropical rain forests*
4.2 Tropical deciduous forest*
4.3 Mangrove swamp
4.4 Cloud forest*
4.5 Preservation of tropical forests*
4.6 Tropical savannas

UNIT 5. TROPICAL MARINE HABITATS
5.1 Coral reefs*
5.2 Grass beds
5.3 Tide pools
5.4 Deep water
5.5 Beach communities

UNIT 6. HUMAN IMPACT
6.1 Cash cropping*
6.2 Biological resources and sustainable economy*

COURSE REQUIREMENTS:

1. Worksheets, assigned summaries of readings and videos (one due each week)
2. Field quizzes
3. Written tests
4. Attendance of three hour seminar one week prior to trip, field trips, lectures
5. Research Paper
6. Field diary
7. Oral presentation
8. Species identification
9. Final examination and post trip discussion the week following the trip

Student Success Center. Tutors may be obtained through the Student Success Center. Contact the staff in C219 if this service is desired. John A. Logan College will make reasonable accommodations for students with documented disabilities under Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Any student with a disability that may have some impact on work in this class, who feels she/he needs an accommodation, should make an appointment with the Coordinator of Services for Students with Disabilities on campus, Jennifer Frost, Room C219B, Ext. 8516. Before services can be provided, this advisor must determine eligibility and arrange appropriate academic adjustments. ***It is the student's responsibility to register in advance of a school term with this office and to turn in a schedule each term to ensure that there is every opportunity for success in this class.***

English Writing Center/Tutoring. For assistance with writing assignments in any college course, students are encouraged to visit "The Write Place" in Room E109. English instructors are available for one-on-one tutoring each semester during hours posted at the center.

Financial Aid. Students who receive financial assistance and completely withdraw from classes prior to 60% of the semester being completed (approximately 2-3 weeks after midterm) could be responsible to return a portion of their Federal Pell Grant award. Prior to withdrawing from courses, students should contact the Financial Aid Office.

Course Withdrawal Information. It is expected that you will attend this class regularly. If you stop attending for any reason, you should contact your advisor and withdraw officially to avoid the posting of a failing grade (an E) to your transcript. It is also advisable to discuss the situation with your instructor before dropping.

METHOD OF EVALUATION:

Grading Scale:

89.5 - 100% = A
79.5 - 89.4% = B
69.5 - 79.4% = C
59.5 - 69.4% = D
Below 59.5% = E

1. Field quizzes
2. Demonstration of knowledge of tropical ecology by discussion and quizzes
3. Attendance and participation in field work
4. Evaluation of assignments
5. Final examination

The final grade will be determined as follows:

Quizzes, summaries, worksheets, sustainable development proposal, participation, discussion, oral presentation.....25%
Term paper.....25%
Species identification.....25%
Final examination.....25%

METHOD OF PRESENTATION:

The course, with sessions on campus and field work in the tropical study area, will include: lecture, overhead transparencies, projected slides, films, videos, chalkboard, readings, work sheets, discussion, field trips, including use of binoculars, field microscope, hand lens, snorkeling, field guides, and water analysis equipment.

TEXT:

Required Texts:

A Neotropical Companion, Second Edition, John Kricher, Princeton University Press, 1997. ISBN 0-691-044-33-3

Optional Texts:

Field Guide to the Birds of Trinidad and Tabago, Martyn Kenefick, Yale University Press, 2008.

A Field Guide to Coral Reefs, Caribbean and Florida, Eugene H. Kaplan, Houghton Mifflin Company, 1982. ISBN 0618-00211-1

A Field Guide to Southeastern and Caribbean Seashores, E. H. Kaplan, Houghton Mifflin Company, 1988.

A Guide to the Birds of Trinidad and Tobago, Richard Ffrench, 2nd Ed.,Cornell University Press, 1991.

Supplementary Texts and Readings: (Most available in the college library or your public library)

Conservation Ecology, Biosphere and Biosurvival, George W. Cox, Wm. C. Brown Publishers, 1993.

Environmental Science, Fifth Edition, William P. Cunningham and Barbara Woodsworth Saigo, WCB, McGraw Hill, 1999.

Marine Biology, Third Edition, Peter Castro and Michael E. Huber, McGraw Hill, 2000.

Concepts of Ecology, Fourth Edition, Edward Kormandy, 1996.

A Guide to the Birds of Trinidad and Tobago, Richard Ffrench, Cornell University Press, 1991.

People of the Tropical Rainforest, Julie Sloan Denslow and Christine Padoch, Univ. of California Press, 1988.

Sensuous Seas, E. H. Kaplan, Princeton University Press, 2006.

A Continent of Islands, Searching for the Caribbean Destiny, Mark Kurlansky, Perseus Books, 1st printing, 1992.

Environmental Science, G. Tyler Miller, Wadsworth Publishers, 1995.

Living in the Environment, G. Tyler Miller, Eighth Edition, Wadsworth Publishers, 1994.

Ecology Concepts and Applications, Manual C. Molles, Jr. WCB, McGraw Hill, 3rd Ed., 2005.

The Economy of Nature, Robert E. Ricklefs, W. H. Freeman Company, Sixth Edition, 2008. ISBN 13:978-0-716-78697-9

Green Planet, David Moore, Cambridge University Press, 1982. ISBN 10:0-7167-6697-4

Biology, Peter Raven and George B. Johnson, Wm. C. Brown Publishers, 1995.

Ecology, Robert E. Ricklefs, W. H. Freeman Company, 1990.
The Earth Care Annual, Russell Wild, National Wildlife Federation, Rodale Press, 1993.

State of the World, 2004, A Worldwatch Institute Report on Progress toward a Sustainable Society, W. W. Norton & Company, 2004.

Tropical Nature, A. Forsyth and K. Miyata, McMillan 1989.

A Neotropical Companion, J. Kricher, Second Edition, Princeton University Press.

R. L. Smith, Ecology and Field Biology, Sixth Edition, Benjamin Cummings, 2001.

INSTRUCTOR: Nelda W. Hinckley

DATE: Summer, 2009

John A. Logan College Telephone Numbers

Carterville and Williamson County ..... 985-3741 (operator)
985-2828 (direct extension access)
Carbondale and Jackson County ..... 549-7335 (operator)
457-7676 (direct extension access)
Du Quoin 542-8612
West Frankfort 937-3438
Crab Orchard, Gorham, & Trico areas 1-800-851-4720
TTY (hearing-impaired access) 985-2752

John A. Logan College does not discriminate on the basis of race, religion, color, national origin, disability, age, sexual orientation, or gender orientation.

STUDENT COMPETENCIES:

Upon completion of each unit, students will be able to:

1.1.1 Identify three tropical countries in South America.
1.1.2 List four tropical countries in Africa.
1.1.3 Locate three tropical countries in Asia.
1.1.4 Name nine countries with tropical deserts and the continent where each is found.
1.1.5 Compare tropical and a temperate climate.

2.1.1 Discuss the consequences of rain forest destruction.
2.1.2 Name two factors which stimulate rain forest destruction.
2.2.1 List examples of organisms found in tropical rain forests.
2.3.1 Locate Panama on a world map.
2.3.2 Discuss the symbiotic relationship of two tropical species.

3.1 Locate tropical study area on the map, give its location in relation to its distance from the equator and hemisphere.
3.2 Describe the area's climate and the season in which the trip will occur.
3.3 Demonstrate behavior acceptable to the local population.
3.4 Prepare to travel safely in a tropical area.
3.5 Identify fifteen bird species in the tropical area.
3.6 List representative species of the different classes of organisms found in the study area.

4.1.1 Define a tropical rain forest.
4.1.2 Locate 7 countries that have tropical rain forests.
4.1.3 List the benefits of maintaining tropical rain forests.
4.1.4 Contrast a tropical rain forest soil with a temperate forest soil.
4.2.1 Define a tropical dry forest.
4.2.2 Locate countries with tropical dry forests.
4.3.1 Describe a mangrove swamp and its role in tropical ecosystems.
4.4.1 Define a cloud forest and give the location of one.
4.5.1 Propose ways that tropical forests may be preserved.
4.6.1 Define a savanna and contrast selected species in African and South American savannas.
4.6.2 Describe the savanna in the study area.

5.1.1 Describe reef ecology, locate major coral reefs of the world and list the threats to each.

6.1.1 Define “cash cropping.”
6.2.1 Discuss ecological consequences of development.
6.2.2 Define sustainable development.
6.2.3 Develop questionnaires to assess attitudes of local population toward natural resources.
6.2.4 Discourse on the tropical environment and the views of the local population with people back home (seminar).

UNIT DESCRIPTION AND ASSIGNMENTS:

UNIT 1. INTRODUCTION TO TROPICAL AREAS

Goal:

To locate tropical areas on a world map and determine the role of climate and temperature.

Assignment:

Read Kricher, Neotropical Companion F, Chapter 1.

Green Planet, Chapter 4 (Alternate: Living in the Environment, Chapter 5 or Molles, Ecology Concepts and Applications, Chapter 2) and Good’s Atlas.

Activities:

Location of tropical areas on a global map and identification of countries in the areas. Worksheet.

UNIT 2. ECOLOGICAL PRINCIPLES

Goal:

To define ecology, recognize the role of ecological principles in management of tropical ecosystems, and describe the relationship of selected tropical species.

Assignment:

Read Kricher, Neotropical Companion, Chapters 2, 4, 5; Ricklefs, Ecology, Chapters 1, 2, 3. (Alternate: Living in the Environment, Chapter 4 or Molles, Ecology Concepts and Applications, Chapter 1).

Activities:

Water measurements: Freshwater pool, mangrove swamp, and marine water.

UNIT 3. TROPICAL STUDY AREA OVERVIEW

Goal:

To identify the geographic area to be studied, attend to travel details, begin bird identification, and obtain a general survey of the area's natural history.

Assignment:

Read Kricher, Neotropical Companion, Chapter 12, Appendix.
Read handout about tropical country to be visited and its local people.

Obtain Birds of Trinidad and Tobago from library to become familiar with species.

Activities:

Field Trips: Asa Wright Nature Center Trails, Lalaja Road, Matura Bay turtle watch, and waste water treatment plant in Trinidad; Gilpin Trace, water treatment plant, Tobago, and Little Tobago.

UNIT 4. TROPICAL RAIN FORESTS AND SAVANNAS

Goal:

To identify types of rain forests, their location, their role in maintaining climate and species diversity, and to examine rain forest destruction from another country's viewpoint; contrast tropical and temperate forest soils; determine difference between tropical evergreen forest and tropical deciduous forest; examine mangrove ecosystem; and contrast species found in African and South American savannas.

Assignment:

Read Kricher, Neotropical Companion, Chapters 3, 10, 11 pp. 239-246 and 13
Raven and Johnson, Biology, - Chapter 26 pp. 518-524.
(Alternate: Appropriate materials in Johnson, Biology)
Johnson, Biology, Chapter 36, pp. 895-902, 191 and 195.
Kaplan, Southern and Caribbean Seashores, Chapter 9.
Moore, Green Planet, pp. 178-179, 206-207.
Wild, "Fire At the Equator" The Earth Care Annual, pp. 143-149.
Molles, Ecology Concepts and Applications, Chapter 2.
Riclefs, The Economy of Nature. Chapter 5

Read one other article from the rain forest bibliography or current literature and write a summary.
Worksheet.
Color rain forest locations on map, identifying countries where they are located.
Read handout on Brazil's viewpoint.
Watch rain forest video in LRC and write summary.
Keep a field diary. The instructor will check and return it to student.
Activities: Field trips to Caroni Swamp, tropical evergreen rain forest, and tropical deciduous forest.

UNIT 5. TROPICAL MARINE HABITATS

5.1 Coral Reefs

Goal:

Examine coral reef ecology; locate major coral reefs in the world and identify threats to each.

Assignment:

Read Kricher, Neotropical Companion, Chapter 11**.**
Other readings: Castro, Marine Biology, Chapter 13, 2000**.**
Cunningham, Environmental Science, pp. 83, 103-104, 279, 326. (Alternate: Earth Care Annual 1993), pp. 2-21(or Robert Leo Smith, Ecology and Field Biology, pp. 344-345.)
Robert Coram, "Water Worlds," Audubon, May-June, 1995, pp. 38-52. (Alternate: Hinrichsen, Dan "Reefs at Risk," Defenders Magazine, Summer 1999, pp. 6-15.
David H. Levy, "A Hidden Vanishing World", Parade Magazine, Jan. 6, 2002, pp. 18-20.)
Susan Milius, "The Next Ocean," Science News. March 15, 2008, pp. 170-172.

Write summaries of two of the above. (Alternate: Select two articles from current literature or Coral Reef Bibliography and write summary.)
Watch video: "Cities of Coral" in Learning Lab and write summary.
Activities: Snorkel fringing reef and Angel reef, and trip by glass-bottom boat.
Video: "Fish and Marine Life of the Caribbean."

UNIT 6. HUMAN IMPACT

6.1 Cash Cropping

Goal:

To define cash cropping, explore its consequences, propose alternatives.

Assignment:

Read Kricher, Neotropical Companion, Chapter 14
Cunningham, Environmental Science, Chapter 11. (Alternates: Miller, Environmental Science, 1995, pp. 125-128, Kormandy, Concepts of Ecology, Chapter 19, pp. 453-463, 20, pp. 476-484).

6.2 Biological Resources and Sustainable Economy

Goal:

To recognize the needs of human population in the tropical study area, measure the local population's views of natural resources, appraise proposed development relative to preservation of habitat and species diversity, and share information with people "back home."

Assignment:

Read Kricher, Neotropical Companion, Chapter 6, 7.
State of the World 2002. "Rethinking International Tourism" by Lisa Mastny, Chapter 5.
World Watch Institute, Chapter 10. Appropriate materials in Miller, Environmental Science, 1995.

Watch video in Learning Lab: "A Walk in the Rainforest with Dr. James Duke"
Design questionnaire.
Propose sustainable development or economy for the Island of Tobago (one page).
Write term paper following the format used in the magazine, "Science."
Give presentation on research topic to group while in Trinidad and Tobago.
Show videos of trip, slides, and photos with family and friends at participants' slide show at potluck dinner.