

## Item 19a



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### **BIOCEP-611: ECOLOGY, BIODIVERSITY AND CONSERVATION BIOLOGY**

**(3 ECTS, 4 MC)**

#### Course Description and Syllabus

##### **Basic Information**

|                                     |  |
|-------------------------------------|--|
| <b>Type of Course</b>               | Lecture with practical exercises                 |
| <b>Term</b>                         | 1 <sup>st</sup> semester                         |
| <b>Expected no. of participants</b> | < 20   |
| <b>Language</b>                     | English  |
| <b>Hours per week in term</b>       | 4 hr/week for lecture<br>2 hr/week for practical |

##### **Instructors**

|                   |             |
|-------------------|-------------|
| Dr. Aung Myo Hsan | Coordinator |
| Dr. Htet Htet Lin |             |
| Sabae Oo          |             |

##### **LEARNING OUTCOMES**

After completion of the course the student should be able to:

1. Know fundamental concepts within Ecology, Biodiversity and Conservation
2. Discuss spatial and temporal aspects of biodiversity
3. Explain the major causes behind the global biodiversity loss
4. Assess and analyse the ecological and societal consequences of an altered biodiversity
5. Summarise and apply different viewpoints and questions within conservation biology

related to biodiversity

6. Recognize the interactions and conflicts between economic and social development and conservation of ecosystems; as well as moral and ethical issues
7. Identify the main threats to biological diversity
8. Evaluate the effects of human activities (e.g. habitat fragmentation and degradation, overexploitation, pollution, climate change, intensive agriculture, and invasive species) on biodiversity.
9. Identify of the complexities of environmental conservation
10. Overview the current political and economic concerns of conservation, the players involved, and their roles
11. Analyse information generated from scientific investigations and use scientific results to address conservation and biodiversity issues.
12. Critically evaluate different conservation biology views
13. Use some methods for valuation of ecosystem services
14. Communicate and discuss knowledge on biodiversity and ecosystem services

### **COURSE OBJECTIVE**

The main objective of the course is to provide an introduction to the principles of Ecology, Biodiversity and Conservation. The course will be divided into approximately 30% essential Ecology and 70% Biodiversity and Conservation. Through lectures and practices, students will learn about basic principles in Ecology, Biodiversity and Conservation Biology; human activities and global change processes that threaten biodiversity; conservation interventions and project planning; conservation research and monitoring; conservation management, interventions and planning.

Topics will often be examined through interdisciplinary knowledge, from the humanities to natural sciences (Ecology, Conservation, Wildlife management, Forestry, Economics and Legislation). This knowledge would be valuable to address the ecological challenges we face in the 21st century, and to design policies and strategies for biodiversity conservation.

The course comprises of four modules with 15 units and field activities and demonstrations.

## **MODULE I – TOPICS ON ECOLOGY, BIODIVERSITY AND CONSERVATION**

Units of the Module I will introduce students to the main concepts on Conservation Biology and Biodiversity. Also, they will recapitulate the essential knowledge on Ecology of tropical forest systems and tropical marine ecosystems. Finally, they will learn about the sixth wave of extinctions and global biodiversity loss that we are currently experiencing.

Unit 1. What is Conservation Biology?

Unit 2. Biodiversity: spatial and temporal patterns and processes in terrestrial and marine ecosystems

Unit 3. Ecology of tropical forest systems

Unit 4. Ecology of tropical marine ecosystems

Unit 5. Overview of Global Biodiversity and the Extinction Crisis

## **MODULE II – CAUSES AND CONSEQUENCES OF BIODIVERSITY LOSS**

Units of the Module II will report the major pressures to biodiversity conservation. One of the major threats is the fragmentation and alteration of habitats through land use change. Also, some alien or exotic species are intentionally (or accidentally) introduced beyond their natural range, thus becoming invasive species and representing a risk for native biodiversity. In addition, overexploitation of natural populations is a major driver of biodiversity loss and in the decline of species over the last 50 years. Moreover, pollutants originated by human activities may affect the health of humans, domestic animals and wildlife. Finally, monoculture implies a genetic uniformity in crop species, imposed by new practices in industrialized agriculture, thus increasing their vulnerability to environmental stresses such as diseases and leading to a biodiversity loss.

Unit 6. Global Change and loss of Biodiversity

Unit 7. Habitat Loss and Fragmentation

Unit 8. Invasive Species

Unit 9. Overharvest of natural populations

Unit 10. Disease and Pollution

Unit 11. Loss of Genetic Diversity in Crops

### **MODULE III – MANAGEMENT, STRATEGIES AND POLICIES FOR BIODIVERSITY CONSERVATION**

Module III will examine the topics, benefits, and limitations of the different management and strategies for conserving biodiversity. The module will show that conservation actions such as captive breeding of endangered species, the establishment of protected areas, restoration and reforestation of damaged areas, ecotourism, and sustainable agriculture can have help to restore biodiversity in many areas. In addition, different ecosystem services will be shown as the variety of benefits to humans gifted by the natural environment and from healthy ecosystems.

Unit 12. The Role of Science in Biodiversity Conservation

Unit 13. Sustainable conservation models: public, private and community.

Unit 14. Nature-based tourism

Unit 15. Ecosystem services - importance and valuation

### **MODULE IV – FIELD ACTIVITIES and DEMONSTRATIONS**

1. Monitoring and census of wild bird populations in different habitats
2. Capture and scientific banding of birds.
3. Field excursion to a Natural protected area.
4. Field excursion to an Ecotourism project.
5. Demonstration of citizen science project (for example, Mosquito alert <http://www.mosquitoalert.com>)

## **TEACHING METHODOLOGY**

Seminar with teamwork and presentation of teamwork to the class, Lecture, Field trip/excursion

## **GRADING**

**1. Exam (7.5 points):** Student's knowledge of the 15 units of Modules I – III will be evaluated in an exam. The exam is composed of, for example, multiple-choice questions, short questions, and is worth 7.5 points. Students will have 3 hours to complete the exam.

**2. Practice report (2.5 points):** Students should deliver a report of the Module IV, indicating the methodology and learning outcomes of each practice

Final grades will be based on accumulated points on both theory (7.5 points) and practice (2.5) score. To pass the course a minimum of 3.75 points and 1.25 points is required in the exam and practice report, respectively

## **ATTENDANCE POLICY**

Minimum requirement of attendance is 75%

## **RECOMMENDED READINGS**

Begon, M., Townsend, C. R. and Harper, J. L. 2006. Ecology from Individuals to Ecosystems, Willey-Blackwell. 750 pp

Campbell, T.W. and Grant, K. R. 2010. Clinical cases in avian and exotic animals hematology and cytology. Willey-Blackwell. 400 pp

Valkiunas. G. 2005. Avian malaria parasites and other haemosporidia. CRC Press. 946 pp