

Module Code: BYU22203

Module Name: From Organisms to Ecosystems

ECTS: 10

Semester Taught: Semester 2

Module Coordinators: Professor Nessa O Connor

This module builds on several of the key concepts including evolution, biodiversity, animal and plant physiology and ecosystem biology. While further introducing core principles that underpin the study of genetics, botany, zoology and global change biology.

- **Module Introduction - Darwin**
- **Natural Selection**
- **Species and speciation**
- **Coevolution**
- **The evolution of sex and sexual selection**
- **Kin selection**
- **Evolution of reciprocity**
- **Molecular genetics**
- **Fitness and selection**
- **Genetic drift and neutral evolution**
- **Molecular phylogenetics**
- **Population Genetics**
- **Human evolution in health and disease**
- **Diversity of life: Conquering the land**
- **Diversity of life: fungi, lichens, algae, angiosperms**
- **Diversity of life: animals, phylogeny and early evolution**
- **Diversity of life: animal feeding strategies**
- **Diversity of life: tetrapods and evolution of humans**
- **Life in extreme environments: evolutionary adaptations**
- **Diversity of animal life: reproductive behaviour**
- **Diversity of plant life: plant reproductive strategies**
- **Interactions between organisms including mutualisms**
- **Animal metabolism**
- **Thermoregulation and Water Stress in Plants**
- **Animal Nutrition and Digestion**
- **Plant Nutrition and Digestion**
- **Circulation and Gas Exchange in Animals**
- **Circulation and Gas Exchange in Plants**
- **Global climates and biomes**
- **Terrestrial ecosystems: forests and grassland**
- **Terrestrial ecosystems: desert, tundra and peatland**
- **Ecological modelling**
- **Freshwater ecosystems: rivers and lakes**

- **Marine ecosystems: estuaries**
- **Marine ecosystems: coastal waters and open seas**
- **Impacts of global climate change**
- **Genes to ecosystems**

Learning Outcomes:

On successful completion of this module, students should be able to:

1. Explain several of the fundamental principles of evolution, genetics, animal and plant diversity, physiology
2. Describe characteristic features of selected ecosystems and their ecology.
3. Use several basic lab-based methods and techniques (e.g. respirometry methods in plants and animals, ecological modelling).
4. Discuss key issues relating to human interactions with natural environments
5. Describe the basic principles of evolution, natural selection, human evolution and consequences for health and disease
6. Appreciate the diversity of life and discuss the evolutionary steps that yield diversity from molecular to individual to whole ecosystem level.
7. Discuss the key physiological processes of animal and plant functioning (e.g. nutrition, gas exchange, metabolism)

Recommended Reading:

Biology, A global Approach -Campbell et al. (11th Ed.) Pearson.

Introduction to Genetic Analysis, chapter 18 - Griffiths et al, (11th Ed.).

Introduction to Genetic Analysis - Griffiths, Wessler, Carroll, Doebley (11th Ed.). W.H. Freeman and Co.

Assessment Details:

Continuous Assessments – 50%

Examination – 50%