Genetics and Evolution

Module Information

2022.01, Approved

Summary Information

Module Code	4206NATSCI
Formal Module Title	Genetics and Evolution
Owning School	Biological and Environmental Sciences
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Biological and Environmental Sciences

Learning Methods

Learning Method Type	Hours
Lecture	30
Practical	12
Workshop	18

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	To i) explain fundamental principles in genetics and genomics, ii) describe evolutionary processes from a genetics/genomics perspective in order to explain the origins of genetic and species diversity.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the molecular basis of genetic diversity
MLO2	2	Describe and interpret Mendelian and non-Mendelian patterns of inheritance in eukaryotes
MLO3	3	Explain how genetic differences can give rise to different phenotypes
MLO4	4	Identify and describe the processes that affect genetic diversity within populations
MLO5	5	Describe how genetic data can provide insights into evolutionary history and undertake computational analyses of genetic data within an evolutionary context

Module Content

Outline Syllabus	Structure of the basic biomolecules, prokaryotes and eukaryotes, the cell cycle, eukaryoticchromosomes and theory of inheritance, mitosis and meiosis, transcription andtranslation, chromatin structure and associated epigenetic changes.Mendelian genetics: mono and dihybrid crosses, sex determination and linkage,chromosomal mapping, cytogenetics, variations in chromosome number, non-Mendelian inheritance, human genetic disease, genetic basis of different phenotypic traits.Molecular genetics: the nature of the gene, the genetic code, detection of genotype,gene expression, basic molecular biology techniques. Applications of genetics to fields withinBiology/Zoology/Anthropology. Genetic control of development. Genomics: model organisms and their contribution to genetics and genomics, the human genome project.Population genetics: Hardy-Weinberg equilibrium, drift, selection and migration.Darwinian evolution and the modern synthesis: speciation, maintenance ofpolymorphisms, altruism, mimicry, kin selection, sexual selection, inclusive fitness.Use of genetics to describe and understand the origins of biodiversity: systematics and the reconstruction of phylogenetic relationships between organisms.
Module Overview	This module explains fundamental principles in genetics and genomics and describes the evolutionary processes from a genetics/genomics perspective in order to explain the origins of genetic and species diversity.
Additional Information	This module explains basic genetic and genomic principles in eukaryotic organisms, and also provides an introduction to several associated areas including cell and developmental biology. It then considers the factors affecting genetic diversity in populations, how new species arise, and how genetic analyses can be used to understand evolutionary history.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Test	Online test	60	0	MLO1, MLO2, MLO3, MLO4, MLO5
Centralised Exam	Exam	40	1.5	MLO1, MLO2, MLO3, MLO4, MLO5

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Richard Brown	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings