Liverpool John Moores University

Title:	GENETICS AND EVOLUTION
Status:	Definitive
Code:	**4206NATSCI** (122045)
Version Start Date:	01-08-2021
Owning School/Faculty:	Biological and Environmental Sciences
Teaching School/Faculty:	Biological and Environmental Sciences

Team	Leader
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Academic Level:	FHEQ4	**Credit Value:**	20	**Total Delivered Hours:**	61.5
Total Learning Hours:	200	**Private Study:**	138.5		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	30
Practical	12
Workshop	18

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	Test	Online test	60	
Exam	Exam	MCQ exam	40	1.5

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.

Learning Outcomes

After completing the module the student should be able to:

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

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Online test	1	2	3	4	5
Exam	1	2	3	4	5

Outline Syllabus

Structure of the basic biomolecules, prokaryotes and eukaryotes, the cell cycle, eukaryotic
chromosomes and theory of inheritance, mitosis and meiosis, transcription and translation, 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 within
Biology/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 of polymorphisms, 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.

Learning Activities

Lectures, workshops and laboratory practicals.

Notes

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.