BIOS 3014 GENES, GENOMICS AND HUMAN HEALTH

Credit Points 10

Legacy Code 300820

Coordinator Graham Jones (https://directory.westernsydney.edu.au/search/name/Graham Jones/)

Description A genome is all of the genetic information that makes us who we are. Beginning with an overview of the evolution of the human genome, this subject will introduce you to current concepts in gene regulation and how genetic variability is correlated with susceptibility to rare and common disease in individuals and populations. You will also gain practical experience in key methods and analyses of genetic variation and understand how such techniques are delivering new insights into the origins and treatment of human disease.

School Science

Discipline Genetics

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) BIOS 2018 Genetics

Restrictions

Successful completion of 120 credit points

Learning Outcomes

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

1. Describe the structure of the human genome and common genetic variants in the genome
2. Explain the mechanisms by which the integrity of the human genome is maintained and relate errors in these pathways to human health
3. Compare and contrast the genetic basis of rare single-gene Mendelian disorders with common complex multi-gene disorders
4. Describe methods of genetic analysis as applied to single gene and multi-gene disorders
5. Evaluate the role of genetics in exploring the relationship between lifestyle, the environment, and common human diseases
6. Gather information, plan, complete and analyse experiments in molecular genetics

Subject Content

1. Genomes and genetic variation: comparative analysis genomes; the human genome project; defining genetic variation; examining how genetic variation can identify individuals and populations
2. The origins of genetic variants in the human genome: mechanisms that maintain the integrity of the human genome; errors in DNA repair that are associated with disease
3. Epigenetics and health: X-inactivation and imprinting
4. Rare and common genetic variants: Mendelian and non-mendelian inheritance of disease; exploring the relationship between genotype and phenotype
5. Genetic analysis: single-gene and whole-genome approaches; designing a study to search for a genetic basis of disease
6. Genetic basis of common diseases: asthma; obesity; dementia; the effect of lifestyle and the environment
7. Cancer: heritable and non-heritable cancer; breast cancer and melanoma
8. Pharmacogenomics: correlating drug response to individual genotype; prediction of therapeutic response based upon individual genotype
9. Human ethics

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Quiz	1 hour	10	N	Individual
Critical Review	2000 words	20	N	Individual
Report	1500 words	40	N	Individual
Applied Project	2000 words	30	N	Group

Prescribed Texts

- Human Molecular Genetics, 4th Edition, 2011 Tom Strachan and Andrew Read, Garland Science

Teaching Periods

Autumn (2022)

Campbelltown

Day

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View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=BIOS3014_22-AUT_CA_D#subjects)

Parramatta - Victoria Rd

Day

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Autumn (2023)

Campbelltown

On-site

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