

CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	BIOL 203	Course Title	Genetics			
Credit Value	3	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	<i>Lecture</i>	<i>Tutorial</i>	<i>Laboratory</i>	<i>Total</i>
			3	1	0	4
Course Description	<p>This course is an introduction to genetics as it is practiced in today's research labs. Emphasis will be on how discoveries are made in genetics, generally through the use of mutational analysis to dissect biological functions. Hence there is an emphasis on experimental approaches involving the analysis of crosses, and manipulating DNA, RNA and protein at the single gene and genomic levels. Principles applying to single genes will be extended to multiple gene systems and to populations. Applications of genetics to human society will be an additional focus, as well as the ethical issues of genomic manipulations and biotechnology.</p>					
Prerequisite(s)	ENGL 100, BIOL 102					
Initial Articulation Targets	<i>UBC</i>	<i>SFU</i>	<i>UVic</i>	<i>UNBC</i>	<i>TRU</i>	
	BIOL 234 (3)	BISC 202 (3)	BIOL 230 (1.5)	BIOL 210 (3)	BIOL 2XX0 (3); exemption for TRU BIOL 2340	
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca					
Learning Outcomes	<p>Upon successful completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the unique methodology and logic by which genetic inference is made • Solve complex genetic analysis • Determine certainty of experimental outcomes • Analyze data presented in the form of genetics problems • Interpret phenotypic outcomes of genetic crosses • Analyze ways in which genetics has revolutionized science • Describe ways in which the discoveries of genetics have had an impact on modern human society • Explain the genetic underpinnings of population ecology and human evolution 					



Content	<p>Core topics – all of the following will be covered:</p> <ul style="list-style-type: none">• Review of cell structure, genes, alleles, mitosis and meiosis• Categories and mechanisms of mutations• Review and extension of Mendelian genetics• How to induce and recover mutants• Testing for single gene mutations: Mendel’s 1st law – Dominance• Manipulating two or more independent mutations: Mendel’s 2nd law – Independent assortment• Dealing with uncertainty using statistics: Chi squared• The genetics of sex and sex determination• The genetic basis of aging• Linkage analysis and chromosome mapping• Analyzing allelic interaction• Genetics of prokaryotes and viruses• Cloning using bacteria and vectors• Methods of gene sequencing• Analysis of complete genomes (genomics)• Laboratory technologies for analysis of DNA, RNA and protein in relation to a gene of interest• Mobile genetic elements• Gene regulation• Recombinant DNA technology: creating genetically modified organisms• Making and utilizing transgenic organisms for research and commerce• Modern advances of genetic engineering and the implications in medicine, criminal justice, agriculture and society• Analyzing complex phenotypes (quantitative and threshold traits)• Population genetics• Applications of genetics to evolution• Ethical issues arising in genetics <p>Additional topics may also be covered, at the discretion of the instructor.</p>
Methods of Instruction	Lectures, demonstrations, small group discussions, case study analysis, concept mapping, and internet research.
Required Textbook(s)	<p>The following textbook(s) is/are required, or approved equivalent(s).</p> <p>Klug, William et al. Concepts of Genetics. 12th Ed. Peason, 2019.</p>
Required Equipment and Technology	<p>Students are required to have a computer with internet access.</p> <p>The following resources are provided by the College:</p> <ul style="list-style-type: none">• Office 365• Student email



Homework Hours	At minimum, students can expect one hour of homework for every hour of instructional time.		
Evaluation	<i>Component</i>	<i>% Value</i>	
	Assignments, participation, quizzes	20-40%	
	Midterm examination	20-40%	
	Final examination	30-35%	
Completion Requirements	The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.		
Course Designer(s)	Anthony Griffiths, Ph.D., Professor Emeritus, Botany Department, University of British Columbia	Consultant(s), if applicable	
Dean's Approval	Barbara Moon, Ph.D. Dean of Arts and Sciences, Alexander College	Dean's Approval Date	October 15, 2014
Curriculum Committee Approval Date	October 15, 2014	First Term Offered	Spring 2016
Last Review Date	March 1, 2023	Next Review Date	March 1, 2028
Revision History	<p>April 29, 2015 – Prerequisite BIOL 101 removed, per Barbara Moon.</p> <p>March 1, 2023-Minor updates (e.g., assessment ranges, textbooks) by Lindsey Spielman and Carol Pollock.</p> <p>September 1, 2024 – English prerequisite increased to ENGL 100.</p>		