



Biology and Medicine Pre-Major (ASBIOL)

Program Outline

PROGRAM IMPLEMENTATION DATE: September 2016
OUTLINE EFFECTIVE DATE: September 2022
PROGRAM OUTLINE REVIEW DATE: March 2027

GENERAL PROGRAM DESCRIPTION:

The Biology and Medicine Pre-Major Pathway program identifies a recommended pathway for the first two years of study towards a four-year degree in Biology. This pathway also maps the strongly recommended course prerequisites for admission into the UBC School of Medicine, as well as providing two of the first three required years of study before applying to medical school. Students who complete all requirements of this pathway will earn a College of the Rockies Associate of Science degree.

Program Information:

The Pre-Major pathway meets the requirements of the Biology Flexible Pre-Major; therefore, students who complete the pre-major are eligible for admission into Year 3 in the UBC Biology undergraduate program or other Biology degree programs across the province.

After transfer, students with a goal of medical school complete at least one additional year (30 credits), including UBC BIOC 302 or equivalent, for a total of 90 post-secondary credits, after which they become eligible to apply for admission to the UBC Medicine program.

Students should plan carefully with an education advisor to ensure that all requirements are met.

Delivery: This program is delivered face to face and online.

COTR Credits: 60

Hours for this program: 1515 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	900
Seminars / Tutorials	
Laboratory / Studio Hours	615
Practicum / Field Experience Hours	
Other Contact Hours	
Total	1515

Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	
Formal Work Experience	
Other	
Total	

Program Outline Author or Contact:

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Signature

APPROVAL SIGNATURES:

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Valid from: September 2022 - March 2027

Education Council Approval Date

PROGRAM PREREQUISITES AND TRANSFER CREDIT:

Admission Requirements:

- Secondary school graduation or equivalent
- Minimum 65% in either English Studies 12, English First Peoples 12, ENGL 090, or equivalent (refer to Course Equivalency information on the College Website)
- Either a minimum of 65% in MATH 090, MATH 100, or Principles 12; or Pre-Calculus 11 AND Pre-Calculus 12 with a minimum of 65%; or Pre-Calculus 12 and a minimum of 75% in Calculus 12
- Minimum 60% in Biology 12, Chemistry 12, and Physics 12
- Basic computer skills recommended

Flexible Assessment (FA):

Credit can be awarded for one or more courses in this program through FA Yes No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

Transfer Credit: For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer> .

Students should also contact an academic advisor at the institution where they want transfer credit.

Biology and Medicine Pre-Major Pathway program:

This program is designed to facilitate maximum transferability to a full degree program after 2 years at COTR.

General Requirements: 60 semester credits of first and second year courses. These must include a minimum of 18 credits in Science at the second year level taken in two or more subject areas.

A		6 credits in first year- English		
	ENGL 100	English Composition	3	
	ENGL 101 or ENGL 102	Introduction to Poetry and Drama or Introduction to Prose Fiction	3	
B		6 credits in Mathematics which shall include at least 3 credits in Calculus		
	MATH 103	Differential Calculus	3	
	MATH 104	Integral Calculus	3	
C		36 credits in Science, which shall include at least 3 credits in a laboratory science		
	CHEM 101	Fundamentals of Chemistry 1	3	
	CHEM 102	Fundamentals of Chemistry 2	3	
	BIOL 101	Introduction to Biology 1	3	
	BIOL 102	Introduction to Biology 2	3	
	PHYS 103	Introduction to Physics 1	3	
	CHEM 201	Organic Chemistry 1	3	
	CHEM 202	Organic Chemistry 2	3	
	BIOL 200	Introductory Microbiology	3	UNBC Requirement
	BIOL 201	Cell Biology	3	UVic Requirement
	BIOL 202	Introduction to Biochemistry	3	
	BIOL 203	Genetics	3	UNBC Requirement UVic Requirement
	STAT 106 or Elective	Statistics	3	UVic Requirement
D		6 credits in Arts other than English (excluding Mathematics and Laboratory-based Science courses)		
	INDG 105 or INDG 250 or FNST Elective	Introduction to Health and Wellness in Indigenous Communities or Indigenous Community Health and Healing or First Nation Studies Elective	3	
	PSYC 101 or PSYC 102	Introduction to Psychology 1 Introduction to Psychology 2	3	
E		6 credits in Arts, Science, or other areas		
	STAT 206 or PHYS 104	Calculus Based Statistics or Introduction to Physics	3	PHYS 104 required for UVic and TRU Biology major
	BIOL 208 or BIOL 204	Vertebrate Biology or Introduction to Ecology	3	UBC Requirement UVic Requirement UNBC Requirement
		Total Credits	60	

COURSE GRADE:

To earn an Associate of Science degree, students will be expected to maintain an average overall grade of C or better calculated on all courses counting towards the associate degree.

LADDERING REQUIREMENTS:

Students who complete this pathway can consider entering a Majors program in Biology at the following BC institutions:

- Simon Fraser University
 - Take SFU STAT 201 in Yr. 3
- Thompson Rivers University
 - Take PHYS 103 and PHYS 104
- University of British Columbia-Okanagan
 - Take two organismal courses in Yr. 2
- University of British Columbia-Vancouver
- University of the Fraser Valley
- University of Northern British Columbia
 - Take two organismal courses in Yr. 2
- University of Victoria
 - Take PHYS 103 and PHYS 104
- Vancouver Island University

The Pre-Major pathway is designed for transfer into Year 3 of a Bachelor of Science in Biology program.

Acceptance into a Biology major program is competitive and is not guaranteed. Students may wish to apply for dual admission with COTR and UVic to ensure acceptance into a Year 3 Biology program.

To complete the requirements of pre-med program and apply to UBC, students need to take 30 additional credits including UBC BIOC 302 after completing the COTR Biology and Medicine Pre-Major Pathway program. UBC states that BC applicants with less than a 75% overall academic average will not receive a full file review. All courses, including failures, are counted in the UBC GPA calculation.

Details on the UBC MD undergraduate admissions prerequisites are available here:

<http://mdprogram.med.ubc.ca/files/2015/07/Prerequisite-Chart-2015-2016.pdf>

UBC requires that all 90 credits must be taken at a post-secondary institution. While an advanced placement course such as AP BIOL can count towards prerequisites (with a 4 or better on the AP exam), such courses do not count towards the 90-credit requirement at a post-secondary institution.

Admission to the UBC medical program requires an additional year of study after completing this credential. Admission is limited to Canadian citizens and permanent residents; BC residents are given preference over residents of other provinces.

COURSE DESCRIPTIONS can be found on the COTR SharePoint site:

<http://cotr.bc.ca/courses/>

BIOL 101

An introduction to the structure and function of organisms with particular reference to molecular, biochemical and physiological aspects of the living world. Designed for students seeking a degree or diploma in a field of science or technology, BIOL 101, with BIOL 102, lays the foundations on which the higher-level courses in Biology are based. It is also suitable as an elective course for general interest or arts students.

BIOL 102

BIOL 102 is an introduction to organismic and population biology with emphasis on reproduction, genetics, developmental biology, evolution, diversity and ecology.

BIOL 200

Introduction to Microbiology is an introduction to the general principles of microbiology. Lectures and laboratory exercises explore fundamental topics of microbiology, environmental microbiology and molecular microbiology such as diversity of microorganisms, microbial structure, metabolism, genetics and microbial ecology emphasizing applied, medical and environmental microbiology. The laboratory introduces methods for safe handling of microorganisms, techniques of microbial isolation, enumeration and identification as well as experiments relevant to lectures.

BIOL 201

This course studies the relationship between cell structure and cell function. The structure/function of the cell membrane and most organelles are covered in detail. Topics also include the evolution of the eukaryotic cell, cell movements, and cell reproduction. An introduction to cytogenetics is also presented. The material in Biology 201 is an integral part of an undergraduate biological sciences program and is especially appropriate for students interested in health-related sciences, microbiology, genetics, developmental biology, biochemistry, botany, zoology, and general biology.

BIOL 202

BIOL 202 is a continuation of BIOL 201. Through lectures and labs, the course emphasizes the structural and functional aspects of cellular chemistry. Topics include cellular energetics, enzyme kinetics, respiration, photosynthesis, membrane transport, the genetic code, glycobiology, lipid biology, and protein biology. The laboratory exercises emphasize proper experimental techniques, data collection and analysis and technical writing skills.

BIOL 203

Genetics is the study and understanding of inheritance and development of organisms. This course will provide an introduction to genes and gene function. Mendelian and extra-mendelian genetics and molecular genetics review and expand on these topics explored in first year biology. Topics in transmission, molecular and quantitative genetics will also be discussed. Lab material will include descriptive aspects, techniques, data analysis and experimentation.

BIOL 204

This course studies of the interactions between organisms and their environment at the organismal, population, community and ecosystem levels. Topics considered include energy flow, nutrient cycling, ecological succession, population dynamics and evolutionary processes. Local examples may be used to illustrate some of the principles.

BIOL 208

This course covers the evolution and comparative anatomy of cephalochordates, urochordates, fish, amphibians, reptiles, birds, and mammals. The comparative anatomy of major organ systems among fishes, amphibians, birds, and mammals will be studied in the lab via dissection of representative organisms. The lab will emphasize the relationship between structure and function of vertebrate organisms while the lecture will focus on current controversies and discoveries in the scientific study of vertebrate evolution.

CHEM 101

This course presents the fundamental principles of chemistry with particular reference to acid-base and redox chemistry, electronic structure of atoms and molecules, properties of liquids, gases, solids and their solutions, phase changes, and thermochemistry. The associated laboratory exercises emphasize proper experimental techniques, data collection and analysis, safety and technical writing skills.

CHEM 102

Together with CHEM 101 and CHEM 102 provides a solid foundation in fundamental chemical principles. Topics include equilibrium, thermodynamics, kinetics, electrochemistry, chemistry of the main group elements and the chemistry of organic and biomolecules. The associated laboratory exercises emphasize proper experimental technique, data collection and analysis, safety and technical writing skills.

CHEM 201

CHEM 201 is an introductory course in organic chemistry including the structure and reactions of aliphatic and aromatic hydrocarbons and their derivatives. The laboratory stresses the techniques of preparation, purification and identification of organic compounds.

CHEM 202

CHEM 202 is a continuation of CHEM 201 involving the structure and reactions of the more complex aliphatic, aromatic and heterocyclic systems including an introduction to natural product chemistry and industrially important organic compounds. The laboratory stresses synthetic methods and some analytical procedures.

ENGL 100

English 100 focuses on composition strategies for writing across academic disciplines. Over the course of the term, students will develop an awareness of how rhetorical situations affect composition and refine their understanding of the fundamentals of essay writing (and clear communication more broadly), including paragraphing, thesis statements, essay structure, and citation methods. Students will also learn the fundamentals of critical thinking and analysis, persuasive writing techniques (including rhetorical appeals and modes), scholarly research, and academic reading.

ENGL 101

An introduction to the critical reading of literature through the study and analysis of poetry and drama across historical periods from Shakespeare to twenty-first century poets and dramatists. While this course will teach students how to perform college-level literary analysis of canonical texts, it will also teach students how to question and evaluate the cultural narratives that literature circulates. As such, the class will explore questions of gender, class, race, nationhood/nation building, and the problematic literary canon in order to develop strategies for negotiating complex literary texts and to become better, more nuanced readers.

ENGL 102

English 102 introduces students to the genre of literary fiction from the origins of the short story in early nineteenth century to the novels of twentieth and twenty-first century. The aim of English 102 is to read fiction with an understanding of genre, technique and form; to apply various critical strategies to literary

texts; and to develop analytical writing skills appropriate to essays at the university level. Ultimately, the course encourages students to consider how narrative forms can shape, challenge and respond to their moral, social, and political contexts.

INDG 105

This course adopts a holistic approach to understanding health and wellness within Indigenous communities. Students examine many factors and conditions that impact Indigenous community health from a strength based rather than problem focused approach. This course also focuses on Indigenous worldviews in terms of how community health and wellness is articulated and maintained.

Traditional knowledge and Indigenous scholarship are incorporated alongside critical Indigenous Studies perspectives. Whether delivered face to face or online, the course is treated as an interactive lecture series. Indigenous representatives from local communities and scholars knowledgeable about course topics share their valuable insights and knowledge with students.

INDG 250

This course engages students in the study of Indigenous conceptions of health and healing in contemporary Indigenous communities. Centering on the question “what is health?” students are challenged to learn about and integrate Indigenous conceptions of health into their own practice frameworks and ethical perspectives. This course will rely heavily on Indigenous knowledges, including but not limited to, Elder and Knowledge Holder teachings, Critical Indigenous Theory, and on-the-land learning.

MATH 103

This course is intended for students who are pursuing a Bachelor of Science degree. Topics include: functions, limits, continuity, derivatives, their interpretation, differentiation rules, techniques of differentiation, implicit differentiation, inverse functions, exponential functions, logarithms, applications of differentiation such as linear approximations, Newton’s method, related rates, analysis of graphs, and optimization, the Mean Value Theorem, definite and indefinite integrals, integration by substitution, Riemann sums, and applications of integration.

Calculus is a necessary step in any career in the sciences including Biology, Chemistry, Commerce, Computer Science, Engineering, Geology, Mathematics, Medicine, and Physics. It is also useful in any field which uses Statistics to analyze data.

MATH 104

Topics include: Logarithmic, exponential and hyperbolic functions, complex numbers, integration techniques (substitution, parts, partial fractions, trigonometric substitution, numerical methods), l’Hôpital’s rule, improper integrals, sequences, series, convergence tests (divergence, integral, comparison, limit comparison, ratio, root, and alternating series tests), Taylor Maclaurin and Fourier series, vectors (dot products, vector valued functions), and polar curves.

Calculus is a necessary step in any career in the sciences including Biology, Chemistry, Commerce, Computer Science, Engineering, Geology, Mathematics, Medicine, and Physics. It is also useful in any field which uses Statistics to analyze data.

PHYS 103

This course introduces the student to how calculus is used to build physical theory and to solve problems in kinematics, dynamics, momentum, and centre of mass calculations. In addition, the student is introduced to several conservation laws, in particular conservation of mechanical energy and linear and angular momentum.

PHYS 104

This course builds on PHYS 103. Electric and magnetic fields are used as examples of vector fields, and the concept of flux and Gauss's theorem are used to calculate the electric field in simple cases. Line integrals and the gradient are introduced as a means of going between electric field and potentials. Students are taught the uses for resistors, capacitors, and inductors and how to do calculations for circuits which use them. Ideas from relativity and quantum mechanics are introduced.

PSYC 101

This course provides an introduction to the history, principles, and methods of psychology. Topics may include the brain and behavior, sensation and perception, learning and memory, thinking and language, and states of consciousness.

PSYC 102

This course is a continuation of Psychology 101. Topics may include development across the lifespan, intelligence, motivation, emotion, stress and health, personality, psychological disorders, therapy, and social behavior.

STAT 106

This course introduces the fundamental ideas of statistics and can be applied to any discipline. Topics include: collection, description, and presentation of data; calculating central tendency and dispersion; probability and statistical inference; hypothesis testing (means, proportions, variances, one and two samples); correlation and regression; decision making and sampling, Goodness of Fit Tests, and Contingency Tables.

STAT 206

This course is intended for students who are pursuing Engineering on a Bachelor of Science degree. Topics include probability theory, random variables, expected values, variance, moments, probability distributions (binomial, hypergeometric, Poisson, normal, geometric, negative binomial and gamma), estimation (properties of estimators, method of maximum likelihood and method of moments), hypothesis testing (type I and II errors, and generalized likelihood ratio tests), distributions (χ^2 , t and F) and their tests, goodness of fit and contingency tables, regression and ANOVA.

Statistics are used to analyze data throughout the sciences, including Biology, Chemistry, Commerce, Computer Science, Engineering, Geology, Mathematics, Medicine and Physics.
