Area of Interest: Environmental Science

Biotechnology - Advanced (Co-op and Non Co-op Version)

Ontario College Advanced Diploma Academic Year: 2020/2021
3 Years Program Code: 1020X01FWO
Ottawa Campus

Our Program

Learn the science that drives biotechnology careers.

The three-year Biotechnology - Advanced Ontario College Advanced Diploma program gives you a strong overview of the science that drives biotechnology. With a mix of laboratory and theory courses, you learn about:

- cell and molecular biology
- microbiology and tissue culture
- chemistry, biochemistry and analytical instrumentation
- biochemical engineering, and
- quality systems for professional labs and manufacturing environments

As a student, you have the opportunity to carry out experiments and use state of the art laboratory instruments and tools throughout the program. You will meet alumni, and have the opportunity to attend industry talks and professional networking events.

You have the opportunity to work with government and industry professionals through optional field placements or through participation in industry-aligned applied research projects.

Students also have the option to gain real-world experience through a paid co-operative education (co-op) work term (see Additional Information for more details). Please note that places in the co-op version of the program are subject to availability. Students who elect to apply to the non co-op version of the program may not have the opportunity to transfer to the co-op version at a later date.

Graduates of this program can pursue careers as lab technologists or analysts in biotechnology, health, agriculture and environmental fields. Graduates may seek employment in the production and testing of medical devices, the manufacture of pharmaceuticals and biologics and the production and testing of food/beverage products.

Upon graduation, you may have the credentials to continue your education through articulation agreements between a number of colleges and universities. See details at www.algonquincollege.com/pathways/.

- Are attracted to new technologies.
- Enjoy active and energetic job roles.
- Work well in team-oriented environments.
- Are inquisitive and thorough.
- Enjoy working with their hands.

Employment
Graduates may find employment opportunities in a diverse range of bio-based sectors such as the production of pharmaceuticals or medical devices, food and beverages production, or roles as lab technologists in the biotechnology, agriculture or environmental fields. Graduates may also pursue advanced studies through articulation agreements between the college and various universities.

**Learning Outcomes**

The graduate has reliably demonstrated the ability to:

- Perform laboratory duties independently and in compliance with pertinent legislation and regulations, as well as biotechnology standards and guidelines.
- Collaborate in implementing and evaluating quality control and quality assurance procedures to meet organizational standards and requirements.
- Select and implement best practices for sustainability.
- Complete complex biotechnological applications using advanced principles of chemistry, biology and biostatistics as well as basic principles of physics.
- Co-ordinate, implement and validate laboratory procedures to carry out quantitative and qualitative tests and analyses.
- Co-ordinate, implement and validate standard cell culture procedures under aseptic conditions.
- Co-ordinate, implement and validate molecular biology procedures.
- Manage biological data to support biological scientists and researchers in capturing, organizing/summarizing and storing data.
- Prepare, analyze, interpret, maintain and communicate scientific data effectively.
- Develop and present a strategic plan for ongoing personal and professional development to enhance work performance.
- Apply basic business principles to biotechnology practices.
- Identify and apply discipline-specific practices that contribute to the local and global community through social responsibility, economic commitment and environmental stewardship.

**Program of Study**

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<tr>
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<th>Courses</th>
<th>Hours</th>
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<td>BIO1301</td>
<td>Biology Laboratory</td>
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<td>BTC1300</td>
<td>Biosafety</td>
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<tr>
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** Elective: choose 1 Courses**

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<tr>
<td>BTC3601</td>
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**Choose one from equivalencies: Courses**

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** Elective: choose 1 Courses**

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<td>BTC3501</td>
<td>Research Methods in Biotechnology</td>
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<tr>
<td>BTC3602</td>
<td>Biotechnology Field Placement II</td>
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**Fees for the 2020/2021 Academic Year**

Tuition and related ancillary fees for this program can be viewed by using the Tuition and Fees Estimator tool at [https://www.algonquincollege.com/fee-estimator](https://www.algonquincollege.com/fee-estimator).

Further information on fees can be found by visiting the Registrar’s Office website at [https://www.algonquincollege.com/ro](https://www.algonquincollege.com/ro).

Fees are subject to change.

Additional program related expenses include:

Books and supplies cost approximately $600 per year. Supplies can be purchased at the campus store. See [https://www.algonquincollege.com/coursematerials/](https://www.algonquincollege.com/coursematerials/) for more information about books.
Each student is required to purchase two lab coats, two sets of goggles and rent a locker. Lab coats and goggles may be purchased in the campus store. Lockers may be rented through Parking Services or the Registrar’s Office.

Admission Requirements for the 2021/2022 Academic Year

College Eligibility

- Ontario Secondary School Diploma (OSSD) or equivalent. Applicants with an OSSD showing senior English and/or Mathematics courses at the Basic Level, or with Workplace or Open courses, will be tested to determine their eligibility for admission; OR
- Academic and Career Entrance (ACE) certificate; OR
- General Educational Development (GED) certificate; OR
- Mature Student status (19 years of age or older and without a high school diploma at the start of the program). Eligibility may be determined by academic achievement testing for which a fee of $50 (subject to change) will be charged.

Program Eligibility

- English, Grade 12 (ENG4C or equivalent) with a grade of 60% or higher.
- Mathematics, Grade 12 (MAP4C or equivalent) with a grade of 65% or higher.
- Biology Grade 11 or 12 with a grade of 65% or higher; AND
- Chemistry Grade 11 or 12 with a grade of 65% or higher; OR
- Physics Grade 11 or 12 with a grade of 65% or higher.
- Applicants with international transcripts must provide proof of the subject specific requirements noted above and may be required to provide proof of language proficiency. Domestic applicants with international transcripts must be evaluated through the International Credential Assessment Service of Canada (ICAS) or World Education Services (WES).
- IELTS-International English Language Testing Service (Academic) Overall band of 6.5 with a minimum of 6.0 in each band; OR TOEFL-Internet-based (iBT)-overall 88, with a minimum of 22 in each component: Reading 22; Listening 22; Speaking 22; Writing 22.

Should the number of qualified applicants exceed the number of available places, applicants will be selected on the basis of their proficiency in English, Mathematics, Biology and Chemistry or Physics.

Admission Requirements for 2020/2021 Academic Year

College Eligibility

- Ontario Secondary School Diploma (OSSD) or equivalent. Applicants with an OSSD showing senior English and/or Mathematics courses at the Basic Level, or with Workplace or Open courses, will be tested to determine their eligibility for admission; OR
- Academic and Career Entrance (ACE) certificate; OR
- General Educational Development (GED) certificate; OR
- Mature Student status (19 years of age or older and without a high school diploma at the start of the program). Eligibility may be determined by academic achievement testing for which a fee of $50 (subject to change) will be charged.

Program Eligibility

- English, Grade 12 (ENG4C or equivalent) with a grade of 60% or higher.
- Mathematics, Grade 12 (MAP4C or equivalent) with a grade of 65% or higher.
- Biology Grade 11 or 12 with a grade of 65% or higher. AND
• Chemistry Grade 11 or 12 with a grade of 65% or higher. OR
• Physics Grade 11 or 12 with a grade of 65% or higher.

• International applicants must provide proof of the subject specific requirements noted above along with proof of either: (IELTS / TOEFL) IELTS-International English Language Testing Service (Academic) Overall band of 6.5 with a minimum of 6.0 in each band. OR TOEFL-Internet-based (iBT)-overall 88, with a minimum of 22 in each component: Reading 22; Listening 22; Speaking 22; Writing 22.

Applicants with international transcripts must provide proof of the subject specific requirements noted above and may be required to provide proof of language proficiency.

Should the number of qualified applicants exceed the number of available places, applicants will be selected on the basis of their proficiency in English, Mathematics, Biology and Chemistry or Physics.

**Application Information**

**BIOTECHNOLOGY - ADVANCED (CO-OP AND NON CO-OP VERSION)**
Program Code 1020X01FWO

Applications to full-time day programs must be submitted with official transcripts showing completion of the academic admission requirements through:

ontariocolleges.ca
60 Corporate Court
Guelph, Ontario N1G 5J3
1-888-892-2228

Students currently enrolled in an Ontario secondary school should notify their Guidance Office prior to their online application at http://www.ontariocolleges.ca/.

Applications for Fall Term admission received by February 1 will be given equal consideration. Applications received after February 1 will be processed on a first-come, first-served basis as long as places are available.

International applicants please visit this link for application process information: https://algonquincollege.force.com/myACint/.

For further information on the admissions process, contact:

Registrar`s Office
Algonquin College
1385 Woodroffe Ave
Ottawa, ON K2G 1V8
Telephone: 613-727-0002
Toll-free: 1-800-565-4723
TTY: 613-727-7766
Fax: 613-727-7632
Email: mailto:AskUs@algonquincollege.com

**Additional Information**

Programs at Algonquin College are Bring Your Own Device (BYOD). To see the BYOD requirements for your program, please visit: https://www.algonquincollege.com/byod/.

Apply directly to the co-op or non co-op version of this program through OntarioColleges.ca or our International Application Portal.

Cooperative education (Co-op) allows students to integrate their classroom learning with a real-world experience through paid work terms. Two academic terms prior to the cooperative education work term, students are required to actively participate in and successfully complete the self-directed co-op online readiness activities and in-person workshops.

Students must actively conduct a guided, self-directed job search and are responsible for securing approved program-related paid co-op employment. Students compete for co-op positions
alongside students from Algonquin and other Canadian and international colleges and universities. Algonquin College’s Co-op Department provides assistance in developing co-op job opportunities and facilitates the overall process, but does not guarantee that a student will obtain employment in a co-op work term. Co-op students may be required to re-locate to take part in the co-op employment opportunities available in their industry and must cover all associated expenses; e. g., travel, work permits, visa applications, accommodation and all other incurred expenses.

Co-op work terms are typically 14 weeks in duration and are completed during a term when students are not taking courses.

International students enrolled in a co-op program are required by Immigration, Refugees and Citizenship Canada (IRCC) to have a valid Co-op/Internship Work Permit prior to commencing their work term. Without this document, International students are not legally eligible to engage in work in Canada that is a mandatory part of an academic program.

For more information, please visit https://www.algonquincollege.com/coop.

For more information, contact Rudy Jones, Program Coordinator, at 613-727-4723 ext. 6445 or jonesr1@algonquincollege.com.

Course Descriptions

BCH2301 Biochemistry I

Biochemistry is one of the pillars of modern biotechnology. Students explore water chemistry, followed by the classification of biomolecules including sugars, lipids, nucleic acids and proteins. The structures and functions of these molecules are discussed, along with an elementary description of metabolism and metabolic pathways. Focus is drawn to proteins and their structure/function relationships.

Prerequisite(s): CHE1302
Corerequisite(s): none

BCH2302 Biochemistry I Lab

With a strong focus on proteins, fundamental skills in the biochemistry laboratory are developed and refined. Laboratory topics including solution preparation, pH buffering of solutions, cell lysis, protein precipitation, protein quantification, enzyme activity assays, SDS-PAGE and Western blot analysis. Basic DNA manipulation is also explored.

Prerequisite(s): CHE1303
Corerequisite(s): none

BCH2401 Biochemistry II

Students expand upon their understanding of biochemistry. Emphasis is placed on metabolic pathways and their regulation, particularly aerobic and anaerobic respiration, lipid synthesis and signal transduction. Protein post-translational modification and metabolic controls are discussed. The role of metals in biochemistry is reviewed.

Prerequisite(s): BCH2301
Corerequisite(s): none

BCH2402 Biochemistry II Laboratory

Protein purification and analysis is followed from initial stages of lysis and precipitation, through column purification techniques including ion exchange and gel permeation. Protein quantification via Bradford assays and other techniques are covered, ultimately culminating in a laboratory activity where protein isolation, purification and kinetic measurements for enzyme activity is performed on an important industrial protein from a yeast culture.

Prerequisite(s): BCH2302
Corerequisite(s): none
BIO1300 Cellular Biology

The scientific study of life raises the obvious question: What is life? Students explore the characteristics of life and distinguish living from nonliving things. Students further examine the origins of biological diversity, the structure of cells and their components, as well as the form and function of plants and animals. As a foundation for future study, the cellular basis of reproduction and inheritance, as well as the flow of genetic information, are highlighted.

Prerequisite(s): none
Corerequisite(s): none

BIO1301 Biology Laboratory

Students are introduced to traditional experimentation in biological science. The process of scientific inquiry that includes repeatable observations and testable hypotheses is emphasized. Students perform microscopy, spectral analysis and enzyme kinetic experiments. As students evaluate and implement safe working procedures, the principles of Good Laboratory Practice are introduced.

Prerequisite(s): none
Corerequisite(s): none

BIO1401 Molecular Biology

Understanding biological concepts at the cellular and molecular level is critical in the field of biotechnology. Students learn the molecular biology of how genes influence the function of cells and traits of organisms. Students learn the cellular mechanisms of DNA replication, RNA transcription and protein translation. Students also examine molecular biology techniques including DNA isolation and manipulation, biological transformations, traditional and quantitative PCR, reverse transcription PCR, microarray analysis and protein analysis.

Prerequisite(s): none
Corerequisite(s): none

BIO1402 Molecular Biology Lab

Biotechnologists require practical laboratory experience. Students are provided with a hands-on introduction to techniques used in molecular biology including DNA amplification, digestion, recombination and transformation. Laboratory activities allow students to discover properties of DNA and genes and understand how molecular biology techniques can be utilized to induce the expression of desired traits.

Prerequisite(s): none
Corerequisite(s): none

BIO2302 Microbiology I Lab

Students differentiate between microorganisms microscopically. By growing, isolating and staining microorganisms, students evaluate the potential of physical and chemical agents to inhibit bacterial growth.

Prerequisite(s): none
Corerequisite(s): none

BIO2303 Microbiology I

The ability to identify and differentiate microorganisms is essential in the field of biotechnology. Emphasis is placed on identification and morphology, life processes and metabolic requirements of bacteria. Students further identify physical methods and chemical agents used in the control and inhibition of bacterial cell growth.

Prerequisite(s): none
Corerequisite(s): none
BIO2403 Microbiology II

Students explore the beneficial and practical uses of microorganisms by examining applied microbiology, as it relates to food, drugs and the environment. Students gain knowledge of the immune system and immunity, monoclonal and polyclonal antibody production, serology and antibiotics.

Prerequisite(s): BIO2303
Corerequisite(s): none

BIO2404 Microbiology II Laboratory

Students further expand on techniques to identify microbes commonly found in our surroundings. Independently, students identify and classify an unknown bacterium. Focus is placed on standard procedures to analyze consumer products, fresh and spoiled foods and beverages for microbes. Antimicrobial susceptibility test and environmental monitoring strategies are also assessed.

Prerequisite(s): BIO2302
Corerequisite(s): none

BTC1300 Biosafety

Detailed knowledge of laboratory safety and Biosafety regulations is essential in this field. Students learn how to follow the Canadian Biosafety Guidelines, Ontario WHMIS, Occupational Health and Safety Guidelines and general safe laboratory practices. Students are prepared to work in laboratory environments with chemicals and organisms up to Biosafety level 2.

Prerequisite(s): none
Corerequisite(s): none

BTC1305 Understanding Biotechnology

Students review historical developments in biotechnology, analyze current industry developments and discuss the political, social and ethical implications of biotechnology. Through real-world examples, students explore ways in which biotechnology is improving quality of life through breakthroughs in healthcare, pharmaceuticals, agriculture, industrial and environmental processes. Students articulate ethical viewpoints and core values throughout the discussion of biotechnology and its applications.

Prerequisite(s): none
Corerequisite(s): none

BTC2400 Quality Assurance and Quality Control in Biotechnology

Quality Assurance (QA) and Quality Control (QC) are process management procedures employed to enhance production efficiency and reduce product variability. Learners investigate continuous process improvement efforts in manufacturing (Lean and Kaizen), and explore the application of common quality management systems such as cGMP, ISO9000 and ISO17025 to biotechnology production facilities and laboratories. Learners discuss the importance of documentation and traceability, SOPs, process audits and control charts.

Prerequisite(s): none
Corerequisite(s): none

BTC2405 Analytical Instrumentation

Biotechnologists need to be familiar with figure of merits of analytical methods, and distinguish the most suited solution for an analytical question. Students identify and plan techniques such as sampling, transportation, sample preparation and qualitative/quantitative instrumental analysis of environmental, chemical and biological samples. Students establish an understanding of theory, operation, maintenance, calibration and output of instruments like polymerase chain reaction,
electrophoresis, blotting, sequencing, chromatography, spectroscopy and spectrometry.

Prerequisite(s): none
Corequisite(s): none

**BTC2406 Analytical Instrumentation Laboratory**

Biotechnologists require a solid foundation in the modern techniques of analytical chemistry and instrumentation. Students identify and carry out techniques for sample preparation and qualitative/quantitative analysis of a wide assortment of food, biological and environmental samples. Students develop tools for method development and operation of electrophoretic, microscopic, spectroscopic and chromatographic instruments and quantitative polymerase chain reaction.

Prerequisite(s): none
Corequisite(s): none

**BTC3301 Biotechnology Theory I**

Concurrent with laboratory exercises, students explore nucleic acid manipulation. Nucleic acid replication, regulation, mutation and repair mechanisms are presented along with an overview of genetic engineering. Model organisms illustrate various genetic concepts, along with current applications in biotechnology.

Prerequisite(s): BCH2401
Corequisite(s): none

**BTC3303 Biotechnology I Laboratory**

Using molecular biology techniques, students are provided with practical experience in nucleic acid and protein manipulation. Experimental applications include DNA recombination and PCR.

Prerequisite(s): BCH2402
Corequisite(s): none

**BTC3304 Industrial and Bioprocessing**

Students apply core biotechnology techniques in the field of large scale industrial bio-processing. Industrial processes studied include the production of fuel from sustainable sources, production of biocatalysts and the production of food products and food additives through aerobic and anaerobic bio-processes. Students model fermentation processes and evaluate downstream separation and purification techniques in order to select best practices for safe, profitable and sustainable operations.

Prerequisite(s): BCH2401
Corequisite(s): none

**BTC3305 Industrial and Bioprocessing Laboratory**

The ability to use various organisms and cell cultures to produce high value bio-products is essential in the field of industrial biotechnology. Students gain practical experience by operating various systems and culture conditions, work aseptically during standard techniques and use different methodologies to produce, isolate and purify bio-products. Students are introduced to qualitative and quantitative techniques for the characterization and assessment of bio-product quality.

Prerequisite(s): BCH2402 and BIO2404
Corequisite(s): none

**BTC3404 Biotechnology Practicum**

Essential technical skills are required in the biotechnology sector. Students demonstrate their mastery of a wide range of laboratory skills related to analytical chemistry, instrumentation,
microbiology, biochemistry and biotechnology. Students refine necessary competencies and skills to help them meet career objectives.

Prerequisite(s): none
Corerequisite(s): none

**BTC3405 Biotechnology Theory II**

Concurrent with laboratory exercises in BTC3406, students learn cutting edge biotechnology techniques for manipulation and characterization of macromolecules such as DNA, RNA and proteins. Emphasis is placed on various techniques that support molecular cloning and genetic engineering approaches.

Prerequisite(s): none
Corerequisite(s): none

**BTC3406 Biotechnology II Laboratory**

Students acquire practical experience in cutting edge biotechnology techniques for manipulation and characterization of macromolecules such as proteins, DNA and RNA. Emphasis is placed on various PCR, qPCR, molecular cloning, genetic engineering approaches and different technologies for identification and characterization of wild type and genetically modified organisms. Students are provided the opportunity to apply bioinformatics skills for experimental design and data analysis. Students also gain practical experience in experimental design, multitasking and time management in the laboratory work environment.

Prerequisite(s): BTC3303
Corerequisite(s): none

**BTC3500 Experimental Design for Biotechnology**

Students participate in applied research activities, collaborative applied research projects generated by industry partners, or faculty/student-led initiatives. Through this experiential learning model, students demonstrate the ability to perform experimental design, carry out experiments, collect data and compile reports. Students meet with a faculty advisor and provide progress updates throughout the term.

Prerequisite(s): BCH2402 and BIO2404 and BTC2406 and CHE2404 and ENL2019T
Corerequisite(s): none

**BTC3501 Research Methods in Biotechnology**

In a continuation from BTC3500, students participate in applied research projects in small groups. Students are encouraged to call upon prior learning to engage in project development and management to reach project milestones and objectives. This course must be taken within the same academic year as BTC3500.

Prerequisite(s): BTC3500
Corerequisite(s): none

**BTC3600 Bio-Regulations**

Biotechnologists must comply with federal and provincial legislation and guidelines as they perform research, clinical trials and all work in biotechnology laboratories. Students gain an understanding of current legislation, procedures and policies that exist to regulate workplaces and research in Canada. Through interactive activities, students will apply their understanding of these regulations to case studies.

Prerequisite(s): none
Corerequisite(s): none

**BTC3601 Biotechnology Field Placement I**
Students participate in field placements (internship) with partners from the public or private sector. Through this experiential learning model, students integrate and apply skills acquired throughout the program in a work place setting.

Prerequisite(s): none
Corerequisite(s): none

**BTC3602 Biotechnology Field Placement II**

In a continuation from BTC3601, students participate in field placement (internship) with partners from the public or private sector. Students are encouraged to call upon prior learning to engage in project development and management to reach project milestones and objectives. This course must be taken within the same academic year as BTC3601.

Prerequisite(s): none
Corerequisite(s): none

**CHE1302 General Chemistry**

Biotechnologists require a strong background in the fundamentals of chemistry and principles of applied physics. Students gain an understanding of the periodic table and the chemical/physical properties of elements and compounds. Additionally, topics such as dimensional analysis, atomic structure, reaction stoichiometry, solution preparation, intermolecular forces, chemical equilibrium, chemical kinetics, acid-base chemistry and the use of buffers in biotechnology are studied.

Prerequisite(s): none
Corerequisite(s): none

**CHE1303 Chemistry Laboratory**

Biotechnologists must adhere to Good Laboratory Practice standards and report scientific data concisely. Students develop a skill base that allows them to confidently complete tasks in a chemistry laboratory. Illustrative chemical experiments related to solution preparation, buffer systems, spectroscopy and titrations are covered. Students use technology and critical thinking to assess the accuracy and precision of measurements and results.

Prerequisite(s): none
Corerequisite(s): none

**CHE1401 Organic and Applied Chemistry**

Biotechnologists require a strong understanding of the chemical and physical properties of molecules. Students examine various representations of molecular structure, identify functional groups, and use basic nomenclature for molecules. Students survey the influence of molecular structure on physical properties and chemical reactivity and predict relative physical and chemical behaviour of simple molecules. Students investigate applications of applied Chemistry in the field of biotechnology.

Prerequisite(s): CHE1302
Corerequisite(s): none

**CHE1402 Organic and Applied Chemistry Lab**

Biotechnologists investigate the physical and chemical properties of different classes of organic compounds, as well as carry out a variety of reactions and purifications. Students carry out and evaluate the success of purifications, such as distillation, liquid-liquid extraction and recrystallization. Students comply with environmental legislation and regulations when disposing of chemicals.

Prerequisite(s): CHE1303
Corerequisite(s): none
CHE2403 Analytical and Physical Chemistry

Students must demonstrate a sound understanding of the principles of analytical chemistry and show how these principles are applied in chemistry and related disciplines. Topics include chemical measurements, calibration and operation of analytical equipment, analytical titrations, and sample handling, preservation and transportation.

Prerequisite(s): CHE1302
Corerequisite(s): none

CHE2404 Analytical and Physical Chemistry Lab

Students demonstrate the ability to prepare chemical solutions using precise volumetric tools and glassware. Students prepare analytical standards to produce and apply standard curves for quantitative analysis within the laboratory. Laboratory topics include studies related to gravimetric analysis, volumetric analysis, potentiometric and complexometric titrations, and spectroscopy applications. Students manage, manipulate and report scientific data.

Prerequisite(s): CHE1303
Corerequisite(s): none

CST3301 Bioinformatics and Knowledge Management

Bioinformatics is the use of computers to manage, organize and analyze biological information. Students develop the skills to find online records such as literature review, sequences, genomes and molecular structures, as well as to assess the quality of those records. Students develop a basic understanding of algorithms of sequence alignment tools and their limitations, and employ them to find homology and phylogeny. Students utilize online resources and tools essential for molecular biology procedures such as cloning, genetic material amplification, sequencing, microarray, fingerprinting and protein analysis.

Prerequisite(s): BCH2401
Corerequisite(s): none

ENL1813T Communications I

Communication remains an essential skill sought by employers, regardless of discipline or field of study. Using a practical, vocation-oriented approach, students focus on meeting the requirements of effective communication. Through a combination of lectures, exercises, and independent learning, students practise writing, speaking, reading, listening, locating and documenting information and using technology to communicate professionally. Students develop and strengthen communication skills that contribute to success in both educational and workplace environments.

Prerequisite(s): none
Corerequisite(s): none

ENL2019T Technical Communication for Engineering Technologies

The ability to communicate effectively in a technically-oriented interdisciplinary workplace is a foundational skill in an innovation-driven economy. Students are exposed to exercises and assignments designed to foster independent and collaborative critical thinking, research, writing, visual communication and presentation skills related to technical topics.

Prerequisite(s): ENL1813T
Corerequisite(s): none

GED1020 General Education Elective

Students choose one course, from a group of general education electives, which meets one of the following five theme requirements: Arts in Society, Civic Life, Social and Cultural Understanding, Personal Understanding, and Science & Technology.
GED2012 Achieving Success in the 21st Century

Rapid changes in technology have created new employment and business opportunities that challenge each of us to find our place as citizens in the emerging society. Life in the 21st century presents significant opportunities, creates potential hazards and demands that we face new responsibilities in ethical ways. Students explore the possibilities ahead, assess their own aptitudes and strengths, and apply critical thinking and decision-making tools to help resolve some of the important issues present in our complex society with its competing interests.

GED8700 Environmental Science and Renewable Energy

Students explore the current and future impact of humans on the environment. They review, discuss and debate topics such as climate change, other human stresses on the environment, energy options, environmental policy and the search for new solutions in the hope of promoting future sustainability.

MAT1406 Statistics for Biotechnology Applications

Biotechnologists require an understanding of statistical methods in order to summarize and interpret data from experiments or studies. Using software packages, students will manage, manipulate, analyze and display scientific data. Topics include descriptive statistics, probability and probability models, correlation and regression, and hypothesis testing.

MGT3405 Business Trends in Biotechnology

Students gain an overview of the current marketplace trends in biotechnology and the potential effects these may have on the world economy. Students identify and exploit biotechnological opportunities, organize resources to implement ideas and learn to manage risks. In addition, students develop a plan to anticipate and adapt to changing workforce demands and trends. Students prepare and present up-to-date portfolios and curriculum vitae, and practise interviewing skills.

SCI1300 Essential Laboratory Skills

Working in the biotechnology sector requires a fundamental set of basic laboratory skills. In this competency-based course, students learn and practice essential lab skills through active demonstrations and hands-on lab activities. Students demonstrate their skills through practical assessments in the lab.

WKT2207 Work Term 1

Students gain valuable on-the-job experience. This Cooperative education work term develops further technical expertise for students.
Prerequisite(s): WKT2100
Corerequisite(s): none