



Bioscience Technology - Diploma

PLAR Candidate Guide

Prior Learning Assessment and Recognition (PLAR)

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Prior learning credit options at Saskatchewan Polytechnic

See [Get Credit for What you Know](#) for important information about all options to get credit for prior learning at Sask Polytech, including PLAR, transfer credit, Canadian Armed Forces credit, and equivalency credit.

How to navigate this document

This document contains links to other document sections or webpages. To return to where you were from another section in this document, press the *ALT* key and *left arrow* key at the same time. To return to this webpage from another webpage, close the other webpage or click back on the browser tab for this document.

Contents of this guide

This guide contains the following specific PLAR information and tools for this program

- A. [PLAR fees](#)
- B. [PLAR eligibility and options](#)
- C. [Dates when PLAR assessment is available](#)
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- E. [PLAR contact person](#)
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A. PLAR fees

Fees for PLAR challenges are set to cover our costs for consultation, assessment, and related administrative tasks. PLAR fees are non-refundable and non-transferrable.

The PLAR fees policy is subject to change for each new academic year. Please see the **Cost** section on the [PLAR webpage](#) for current fee information.

B. PLAR eligibility and options

To be eligible for PLAR for courses in this program, you must first apply for admission and be accepted into the program. You must also consult with the [PLAR contact person](#) and be approved for PLAR assessment.

Course pre-requisites and co-requisites

Some courses have one or more other courses that must be completed first (pre-requisite) or at the same time (co-requisite). See [course outlines](#) in this guide to identify any pre- or co-requisites for each course. Discuss with your [PLAR contact person](#) how to deal with courses with co-requisites.

Block assessment

Some programs may assess a cluster of courses together in one block, which may save you time and effort. Ask the [PLAR contact person](#) whether there are any block assessment options in this program.

C. Dates when PLAR assessment is available

PLAR assessment for this program is available from Sept 1 to June 15 in each academic year.

All PLAR assessment must be completed by June 15 of each academic year.

D. Special directions for this program

1. **Review** the [PLAR process and FAQs](#) and the information in this guide.
2. **Self-rate** your learning for each course using the [Course Outlines](#) in this guide.
3. **Consult** with the [PLAR contact person](#) for PLAR approval. Be prepared to provide your resume, course self-ratings (see [section F](#)), and a partially completed [PLAR application](#). If you are approved for PLAR, the contact person will sign your PLAR application and explain next steps.
4. **Apply** for admission to the program. See [directions](#) for applying.
5. **Register** for PLAR at Registration Services once you have signed approval on your [PLAR Application Form](#). The PLAR fee will be added to your student account.
6. **Finalize** a detailed Assessment Plan with your assigned assessor.
7. **Complete** assessment before your PLAR registration expires.

E. PLAR contact person

Contact the person below to arrange a consultation **after** you have read this guide and [general PLAR information](#) and rated yourself for each course (see next session). Consultation may be by phone, online, or in person. Be prepared to provide your resume, course self-ratings, and a partially completed [PLAR application](#). If agreement is reached to go ahead with PLAR, the contact person will sign approval on your PLAR application and explain the next steps. Admission to the program is required before you can register for PLAR.

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F. Self-rating course outlines

Clicking on a course code below opens a page where you can rate yourself on the knowledge and skills assessed for PLAR credit. For Arts & Sciences courses, clicking on the course code opens another PLAR guide. The [PLAR contact person](#) for this program will refer you to another person to discuss PLAR for courses delivered by Arts & Sciences or another program/department.

COURSE CODE	COURSE NAME	Delivered by another department/program
Semester - 1		
ANAT 183	Vertebrate Anatomy and Physiology	
ANAT 184	Vertebrate Anatomy and Physiology Lab	
ANIM 182	Care and Management of Laboratory Animals	
BOTA 183	Botany	
BOTA 184	Botany Lab	
CHEM 171	General Chemistry	
CHEM 172	General Chemistry Lab	
MATH 178	Mathematics 1	Arts & Sciences
SAFE 180	Laboratory Safety	
Semester - 2		
CHEM 173	Analytical Chemistry	
CHEM 174	Analytical Chemistry Lab	
CHEM 287	Organic Chemistry	

COURSE CODE	COURSE NAME	Delivered by another department/program
MATH 278	Mathematics 2	
PHYSL 180	Plant Physiology	
PHYSL 181	Plant Physiology Lab	
QC 179	Quality Assurance and Control	
STAT 181	Introductory Statistics and Computer Applications 1	
Semester - 3		
BIOC 281	Biochemistry	
GENE 181	Genetics	
STAT 286	Statistics and Computer Applications 2	
TCOM 102	Workplace Communication	Arts & Sciences
Semester - 4		
GENE 285	Molecular Biology 1	
GENE 286	Molecular Biology 1 Lab	
HSTC 183	Histotechniques	
LABT 182	Laboratory Preparation Techniques 1	
LABT 288	Analytical Instrumentations 1	
LABT 289	Analytical Instrumentation 1 Lab	
LABT 290	Plant Tissue Culture Lab	
LABT 291	Animal Cell Culture Lab	
MICR 282	General Microbiology 1	
MICR 283	General Microbiology 1 Lab	
Semester - 5		
COMM 289	Communications 2	Arts and Sciences
GENE 287	Molecular Biology 2	

COURSE CODE	COURSE NAME	Delivered by another department/program
GENE 288	Molecular Biology 2 Lab	
IMMU 179	Immunology	
LABT 283	Laboratory Preparation Techniques 2	
LABT 292	Analytical Instrumentation 2	
LABT 293	Analytical Microbiology	
MICR 284	Applied Microbiology	
MICR 285	Applied Microbiology Lab	
PRAC 285	Laboratory Practicum	

ANAT 183 - Vertebrate Anatomy and Physiology

You will study the structure and function of the vertebrate body. You will examine animal cell and tissue types, and organ systems (including the gross anatomical features and function of organs of the integumentary, skeletal, muscular, nervous, digestive, respiratory, circulatory, endocrine and reproductive systems). You will also be introduced to the classification of animals and the characteristics of the vertebrates.

Credit unit(s): 3.0
Pre and Co Requisites: ANAT 184
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine the taxonomic levels used in classification methods.			
2. Relate the features of cell and tissue anatomy.			
3. Examine the components and organization of the integumentary system.			
4. Examine the components, organization, and physiology of the musculoskeletal system.			
5. Relate the structure, organization, and physiology of the nervous and sensory systems.			
6. Examine the components and function of the endocrine system.			
7. Relate the components and physiology of blood and the cardiovascular system.			
8. Examine the components and principles of the lymphatic system.			
9. Relate the principle components and function of the respiratory system.			
10. Relate the features of the digestive system and the function of primary digestive organs.			
11. Differentiate the components and functions of the urinary and reproductive systems.			

ANAT 184 - Vertebrate Anatomy and Physiology Lab

You will use the cat as a model of vertebrate anatomy and physiology relating structure to function. You will examine animal cell and tissue types, and organ systems (including the gross anatomical features and function of organs of the integumentary, skeletal, muscular, nervous, digestive, respiratory, circulatory, endocrine, and reproductive systems). You will also be introduced to classifying animals and the characteristics of the vertebrates.

Credit unit(s): 3.0
Pre and Co Requisites: ANAT 183
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Differentiate animals based on classification methods.			
2. Examine the components and organization of the skeletal system.			
3. Examine the components and organization of the muscular system.			
4. Examine the components of the respiratory system.			
5. Examine the components and organization of the primary digestive organs.			
6. Examine the components and organization of the urogenital system.			
7. Examine the components and organization of the circulatory system.			
8. Examine the structure and organization of the nervous system.			
9. Examine the components of sensory reception.			

ANIM 182 - Care and Management of Laboratory Animals

You will study animal production, animal diets, research protocols and care and management. Laboratory experiences will allow you to practice handling, injections and sample collection in small laboratory species.

Credit unit(s): 2.0
Pre and Co Requisites: none
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss the ethics and welfare issues of animal-based research.			
2. Describe the animal facility.			
3. Explain disinfecting and sterilization.			
4. Explain basic principles of animal research protocols.			
5. Describe defined status animals and their containment and isolation.			
6. Describe the components of nutrition and animal diets.			
7. Discuss animal husbandry.			
8. Describe the characteristics of common lab animal species.			
9. Demonstrate competency in handling common lab animals.			
10. Perform injections and sample collection.			

BOTA 183 - Botany

You will examine anatomy and function in plants, with emphasis on the angiosperms. The course content includes: plant cells and tissues, development of the primary and secondary plant body, flowering and reproduction, and fruit and seed development. You will also distinguish the characteristics of algae, bryophytes, seedless vascular plants, and gymnosperms.

Credit unit(s): 3.0
Pre and Co Requisites: BOTA 184
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Describe plant cell structure and composition in relation to function.			
2. Examine morphogenesis and development of the cells and tissues of the plant body.			
3. Examine primary structure and development of the root and shoot.			
4. Examine secondary growth of roots and stems.			
5. Examine angiosperm reproduction and early development of the plant body.			
6. Describe the distinguishing features of algae and its potential in the bioscience field.			
7. Describe the distinguishing features of bryophytes and seedless vascular plants.			
8. Describe the distinguishing features of gymnosperm.			
9. Discuss the major cereal, oilseed, pulse, and fiber crops of Canada.			

BOTA 184 - Botany Lab

You will analyze plant structure and diversity, with emphasis on microscopic analysis. You will examine plant cells and tissues, primary and secondary plant growth, flowers, fruits, and seeds. You will also distinguish the characteristics of algae, bryophytes, seedless vascular plants, conifers, and crops.

Credit unit(s): 3.0
Pre and Co Requisites: BOTA 183
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Demonstrate proper use and care of a microscope.			
2. Examine plant cells, tissues, stems, leaves, and roots.			
3. Distinguish primary and secondary plant growth.			
4. Examine flower, fruit, and seed structures and types.			
5. Examine distinguishing characteristics of algae, bryophytes, seedless vascular plants, and conifers.			
6. Identify the major cereal, oilseed, and pulse crops of Canada.			

CHEM 171 - General Chemistry

You will receive a firm foundation in chemical concepts and principles and the role that chemistry plays in the bioscience field.

Credit unit(s): 4.0
Pre and Co Requisites: CHEM 172, MATH 178, SAFE 180
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome	Competent	Learning	None
Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.			
1. Describe matter at the macroscopic and microscopic level.			
2. Diagram the electron configuration of an atom utilizing the quantum theory.			
3. Relate the electron configuration of elements to their chemical and physical properties.			
4. Establish the types and number of chemical bonds formed by atoms, and the stability of a chemical compound from the electron configuration of atoms.			
5. Differentiate properties of solids, liquids, and gases.			
6. Distinguish the properties of a gas.			
7. Interpret the role of thermodynamics in chemical reactions.			
8. Evaluate physical properties of solutions.			
9. Relate the concepts of entropy and energy to spontaneity and rate of reactions.			
10. Propose the equilibrium concentration of a product of a reversible chemical reaction.			
11. Analyze acids, bases, salts, and buffers.			

CHEM 172 - General Chemistry Lab

Your laboratory experiments will be designed to enhance the concepts taught and provide application of these principles, as well as introduce you to laboratory techniques and safety in the lab.

Credit unit(s): 4.0
Pre and Co Requisites: CHEM 171, MATH 178, SAFE 180
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome	Competent	Learning	None
Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.			
1. Apply the scientific method of investigating a research problem.			
2. Demonstrate laboratory safety practices.			
3. Use dimensional analysis, algebra, logarithms, and ratio and proportions to solve chemistry lab-based problems.			
4. Use the "mole" concept to solve stoichiometry problems.			
5. Solve stoichiometry problems involving chemical reactions in aqueous solutions.			
6. Identify the physical properties of a solution.			
7. Analyze properties of solids, liquids, and gases.			
8. Analyze the effect of temperature and reactant concentration on the rate of a chemical reaction.			
9. Identify the physical properties of solutions.			

MATH 178 - Mathematics 1

You will review the fundamental concepts of algebra. Your studies will focus on equations of various types, systems of linear equations, variation, properties of exponents and logarithms, logarithmic and exponential equations and graphing. Biological and chemical applications will be used whenever possible.

Credit unit(s): 2.0
Pre and Co Requisites: none
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Use dimensional analysis.			
2. Use algebra.			
3. Solve linear and quadratic equations.			
4. Use logarithms.			
5. Use ratio and proportion.			

SAFE 180 - Laboratory Safety

You will discuss topics related to safe working practices and procedures in the bioscience laboratory. Many of these topics are related to government regulations and industrial laboratory guidelines.

Credit unit(s): 1.0
Pre and Co Requisites: none
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Examine provincial and federal legislation regarding hazardous substances.			
2. Examine safety equipment required in the workplace.			
3. Examine the elements of safe handling and disposal of chemicals.			
4. Relate potential safety hazards, common accidents and reporting.			

CHEM 173 - Analytical Chemistry

Your studies will focus on an intensive survey of the basic methods and chemistry of manual analytical techniques.

Credit unit(s): 3.0
Pre and Co Requisites: CHEM 171, CHEM 172, MATH 178
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Describe analytical techniques and their function.			
2. Determine the significance and reproducibility of experimental data using statistics.			
3. Evaluate the need for quality assurance.			
4. Examine the principles of titrimetric analysis.			
5. Examine the role of gravimetric and combustion analysis.			
6. Compare acids and bases in titrimetric analysis.			
7. Explain role of buffers in biological systems.			
8. Examine complexometric titrations.			

CHEM 174 - Analytical Chemistry Lab

You will develop quality laboratory practices and their relevance to the field of bioscience. Your laboratory work will focus on the skills required in titrations and gravimetric analysis.

Credit unit(s): 3.0
Pre and Co Requisites: CHEM 171, CHEM 172, MATH 178
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Demonstrate personal laboratory safety procedures.			
2. Apply quality laboratory practices.			
3. Analyze acquired data to determine significance and reproducibility using statistics.			
4. Perform gravimetric methods of analysis.			
5. Perform titrimetric methods of analysis.			
6. Prepare and standardize a solution.			
7. Analyze solutions using various titrimetric techniques.			
8. Evaluate prepared solutions and buffers.			

CHEM 287 - Organic Chemistry

You will be introduced to the chemical and physical properties of organic compounds and their uses in the bioscience field. You will study functional groups, nomenclature, simple reactions, stereochemistry, and bonding. You will study the properties, structures, reactions, and industrial uses of important classes of organic compounds. You will use laboratory techniques to extract and characterize organic compounds.

Credit unit(s): 4.0
Pre and Co Requisites: CHEM 171, CHEM 172
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome	Competent	Learning	None
Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.			
1. Examine the structure and properties of aliphatic hydrocarbons.			
2. Examine the structure and properties of aromatic hydrocarbons.			
3. Examine the structure and properties of alcohols, phenols, thiols, and ethers.			
4. Examine the structure and properties of aldehydes and ketones.			
5. Examine the structure and properties of carboxylic acids.			
6. Examine the structure and properties of amines, amides, and esters.			
7. Apply quality laboratory practices in the safe handling of an organic compounds.			
8. Perform extractions of organic compounds from samples.			
9. Perform physical separations of organic compounds.			
10. Analyze mixtures of organic compounds using chromatography techniques.			
11. Investigate stereoisomers using laboratory techniques.			

MATH 278 - Mathematics 2

You will review the fundamental concepts of trigonometry and be introduced to elementary topics in calculus, including limits and derivatives. Biological and chemical applications will be used whenever possible.

Credit unit(s): 2.0
Pre and Co Requisites: MATH 178
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Use trigonometry to solve problems in applied sciences.			
2. Use limits to explore the behaviour of functions.			
3. Use derivatives to solve problems in the applied sciences.			
4. Solve systems of equations using techniques from linear algebra.			

PYSL 180 - Plant Physiology

You will examine plant function and interactions with the environment. You will analyze plant tissue and cellular function with respect to plant growth regulators, mineral nutrition, water, and environmental factors. You will also examine plant metabolism including cellular respiration and photosynthesis reactions.

Credit unit(s): 3.0
Pre and Co Requisites: BOTA 183, PYSL 181
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss the mechanisms and regulatory factors of plant growth and development.			
2. Examine the types and functions of plant growth regulators.			
3. Examine the effect of external factors on plant growth and development.			
4. Describe the flow of energy in the cell.			
5. Examine cellular respiration.			
6. Analyze the production of energy via photosynthesis.			
7. Examine mineral nutrition requirements for plants.			
8. Analyze the movement of water and solutes in the plant.			
9. Examine major insect pests of greenhouse crops, canola, and wheat.			

PYSL 181 - Plant Physiology Lab

You will examine the effects of plant growth regulators, gravity, light, and mineral deficiency on plants. You will conduct experiments demonstrating the processes of osmosis, respiration, and photosynthesis. You will also manage plants in growth chambers.

Credit unit(s): 3.0
Pre and Co Requisites: BOTA 184, PYSL 180
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Develop a laboratory notebook for experiments.			
2. Conduct experiments to analyze cellular respiration and photosynthesis in plants.			
3. Perform a plant breeding experiment.			
4. Perform experiments to examine the effects of light and gravity on plant growth and development.			
5. Conduct experiments to examine the effects of plant growth regulators on growth and development of flowering plants.			
6. Conduct experiments to analyze mineral and water deficiency in plants.			
7. Perform experiments to analyze the movement of water and solutes in plants.			
8. Manage plants in a growth chamber.			

QC 179 - Quality Assurance and Control

You will examine the need for and application of quality management as it applies to the bioscience field. Your studies will focus on quality practices in basic research and development, non-clinical safety testing, manufacturing, and food safety. You will also consider ethics and professional conduct.

Credit unit(s): 4.0
Pre and Co Requisites: SAFE 180
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine the need for quality systems in bioscience.			
2. Distinguish quality systems found in research and development, non-clinical safety testing, clinical testing, manufacturing, and food production.			
3. Investigate ethics in the biosciences.			
4. Examine professional conduct in bioscience.			
5. Examine quality practices in a research and development setting.			
6. Examine documentation in quality systems.			
7. Design a HACCP plan for food production.			
8. Examine Good Laboratory Practice (GLP) in nonclinical safety testing.			
9. Perform a laboratory audit.			
10. Examine Good Manufacturing Practice (GMP) as regulated by Health Canada.			

STAT 181 - Introductory Statistics and Computer Applications 1

You will be introduced to elementary probability, random variables and their distributions, frequency distributions, measures of location, variability and position, sampling theory, and several basic statistical methods that apply to bioscience and chemical technology problems. This introduction will also include using spreadsheets to assist in learning the statistical concepts.

Credit unit(s): 3.0
Pre and Co Requisites: MATH 178
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Apply the principles of introductory statistics in a scientific environment.			
2. Apply basic statistics on populations and probability distributions related to bioscience and chemical technology.			
3. Apply random sampling techniques to general science and engineering studies.			
4. Apply distributions based on samples.			
5. Use regression and correlation analysis.			
6. Use Excel to perform statistical computations.			

BIOC 281 - Biochemistry

You will be introduced to biological compounds including carbohydrates, lipids, proteins, and nucleic acids. You will compare the structure of each group and relate it to biological function. You will be introduced to analytical and biochemical techniques used in the biosciences.

Credit unit(s): 4.0
Pre and Co Requisites: CHEM 287
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome	Competent	Learning	None
Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.			
1. Examine the structure and biological function of carbohydrates.			
2. Examine the structure and biological function of lipids.			
3. Examine the structure and properties of amino acids.			
4. Examine the structure and biological function of proteins.			
5. Discuss enzymes as biological catalysts.			
6. Discuss enzyme characteristics.			
7. Analyze carbohydrates using chemical and chromatographic methods.			
8. Analyze lipids using chromatography.			
9. Analyze proteins using instrumentation.			
10. Analyze enzymes using an assay.			
11. Analyze proteins using SDS-PAGE.			

GENE 181 - Genetics

You will be introduced to transmission, cellular, population and molecular genetics. You will explore Mendelian principles, modes of inheritance, cell division, chromosomes, population dynamics, genes, the genetic code of nucleic acids, gene expression and recombinant Deoxyribonucleic Acid (DNA) technology.

Credit unit(s): 4.0
Pre and Co Requisites: none
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine the principles of transmission genetics and inheritance.			
2. Analyze monohybrid and dihybrid problems and pedigrees.			
3. Analyze the principles of reproduction and growth through the study of cell division.			
4. Relate principles of sex determination and sex linkage.			
5. Examine linkage and chromosome mapping.			
6. Distinguish the effects of chromosomal number and structure.			
7. Examine the principles of population genetics.			
8. Relate gene structure and replication in the transmission of hereditary traits.			
9. Examine the principles of information flow from genes to proteins.			
10. Discuss the principles of recombinant DNA technology.			

STAT 286 - Statistics and Computer Applications 2

You will utilize statistical concepts including confidence intervals, hypothesis testing, regression and correlation analysis, and categorical data analysis. Advanced topics of analysis of variance and non-parametric tests will also be studied. You will utilize statistical programs and spreadsheets in the study of statistical applications.

Credit unit(s): 3.0
Pre and Co Requisites: STAT 181, MATH 278
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Apply statistical techniques to advanced problem solving.			
2. Apply hypothesis testing to problem solving in technological fields.			
3. Apply analysis of variance in problem solving in technological fields.			
4. Apply non-parametric methods in a general science setting.			
5. Use Excel to perform advanced statistical computations.			

TCOM 102 - Workplace Communication

You will examine the employability skills required in the workplace. You will discuss the communication process, and practice effective interpersonal communication techniques and conflict resolution. You will use workplace writing and job search skills.

Credit unit(s): 3.0

Pre and Co Requisites: COM 160, COMM 191, JOBS 190, JOBS 288, JOBS 290, TCOM 102CE, TCOM 120, TCOM 140, TMGT 180

Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine fundamentals of workplace communication.			
2. Discuss conflict resolution techniques.			
3. Apply job-related interpersonal and oral communication strategies.			
4. Apply workplace writing skills.			
5. Use job search skills.			

GENE 285 - Molecular Biology 1

You will study deoxyribonucleic acid (DNA) synthesis methods, transcription and translation in eukaryotes and prokaryotes. You will examine bacterial transcription and regulation of gene expression. You will examine cloning strategies using phage, bacteria, and yeast. You will also examine molecular biology techniques and applications of synthetic biology.

Credit unit(s): 2.0
Pre and Co Requisites: BIOC 281, GENE 181, MICR 283, GENE 286
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine the structure and biological function of nucleic acids, nucleotides and chromosomes.			
2. Examine genes, genome content and recombination mechanisms.			
3. Distinguish prokaryotic and eukaryotic DNA replication and DNA repair mechanisms.			
4. Examine bacterial transcription and regulation of prokaryotic gene expression.			
5. Examine cloning strategies and organisms used in cloning and expression.			
6. Examine molecular biology techniques and the applications of synthetic biology.			

GENE 286 - Molecular Biology 1 Lab

You will isolate, purify, and analyze deoxyribonucleic acid (DNA) using molecular biology techniques. As part of a research project, you will construct recombinant DNA to be used for synthetic biology applications. You will also use bioinformatics to analyze DNA sequences.

Credit unit(s): 4.0
Pre and Co Requisites: BIOOC 281, GENE 181, MICR 282, MICR 283, GENE 285
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Perform extraction and purification of eukaryotic deoxyribonucleic acid (DNA).			
2. Analyze DNA using gel electrophoresis, DNA blotting and hybridization.			
3. Analyze DNA using PCR.			
4. Manage a laboratory notebook for a research project.			
5. Design a DNA construct for an engineered synthetic organism.			
6. Perform DNA cloning and transformation in bacteria.			
7. Prepare bacterial plasmid DNA for cloning and sequencing.			
8. Analyze DNA sequences using bioinformatics.			
9. Construct a recombinant DNA plasmid for preparation of an engineered synthetic organism for the capstone research project.			

HSTC 183 - Histotechniques

You will receive an overview of the principles of microtechniques (including preparing plant and animal tissues for the production of permanent slides). You will learn proper use, care and handling of tissue processing equipment, microtomes, and related slide preparation equipment. You will receive training in the preparation and use of tissue fixatives and stains, embedding, mounting, and storing of paraffin sections. You will perform tissue sectioning, staining, and production of permanent slides. Special techniques including plastic embedding, histochemical staining, fluorescent staining and in situ hybridization will also be introduced.

Credit unit(s): 3.0
Pre and Co Requisites: ANAT 183, ANAT 184, BOTA 183, BOTA 184
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Prepare plant and animal tissues for processing.			
2. Prepare plant and animal tissues for infiltration and embedding in paraplast.			
3. Prepare sections of paraplast embedded tissues using a microtome.			
4. Describe the preparation of frozen tissues using a cryostat.			
5. Describe the preparation of plastic embedded tissues for sectioning using an ultra-microtome.			
6. Use stains and fixatives for plant and animal tissues.			
7. Prepare sections on slides for staining and processing.			
8. Discuss special molecular target techniques such as in-situ hybridization, immunohistology, and reporter gene analysis.			
9. Prepare slides of plant and animal tissues.			

LABT 182 - Laboratory Preparation Techniques 1

You will learn to perform functions normally expected of a laboratory technician by preparing material for first and second year laboratories; including chemical solutions, stains, reagents and various types of culture media. You will be introduced to the operation and care of laboratory equipment, inventory procedures and ordering supplies along with general housekeeping duties required in a laboratory.

Credit unit(s): 2.0
Pre and Co Requisites: MICR 282, MICR 283
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Follow written and verbal instructions in the preparation of laboratory materials and performance of assigned duties.			
2. Demonstrate time-management skills in performance of assigned duties.			
3. Prepare a variety of media and solution to be used in bioscience laboratories.			
4. Apply principals of sterilization and decontamination in preparation and disposal of laboratory materials.			
5. Maintain a clean, well-stocked workplace including laboratory glassware and plastic ware.			
6. Keep accurate records of laboratory activities.			
7. Demonstrate ability to work effectively as a team.			

LABT 288 - Analytical Instrumentation 1

You will be introduced to spectrophotometry and electroanalysis as used in the bioscience field. You will study the chemical background, construction of and mode of operation of these instruments.

Credit unit(s): 3.0

Pre and Co Requisites: CHEM 173, CHEM 174, STAT 181, BIOC 281, LABT 289

Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Relate aspects of quality assurance and calibration methods for spectrophotometry and electrochemistry.			
2. Apply mathematical formulas to determine concentrations.			
3. Discuss fundamentals of electrochemistry including Nernst equation.			
4. Relate the components of electrodes to the operating principles and applications of electrodes.			
5. Discuss fundamentals of spectrophotometry.			
6. Explain the operating principles and applications of various configurations of ultraviolet-visible spectrophotometers.			
7. Describe the components required for atomic spectroscopy.			
8. Explain the operating principles and applications of various configurations of atomic spectrometers.			

LABT 289 - Analytical Instrumentation 1 Lab

You will apply basic maintenance and operating techniques for using ion-selective electrodes and spectrophotometers. You will use analytical instruments to analyze samples and interpret analytic data. You will prepare analytical solutions and use statistics to evaluate data.

Credit unit(s): 3.0
Pre and Co Requisites: CHEM 173, CHEM 174, STAT 181, BIOC 281, LABT 288
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Create calibration standards and samples for instrumental analysis.			
2. Create calibrations for analytical instruments through the appropriate choice of ESTD, matrix matching and standard addition.			
3. Validate the accuracy of analytical instruments applying appropriate quality control procedures.			
4. Perform analyses using ultraviolet-visible (uv-vis), and atomic absorption spectrometry.			
5. Perform analyses using electrochemical methods using ion-selective electrodes.			
6. Troubleshoot errors in data with ion-selective electrodes.			
7. Troubleshoot errors in data from an ultraviolet-visible spectrophotometer.			
8. Troubleshoot errors in data from atomic absorption spectrometers.			

LABT 290 - Plant Tissue Culture Lab

You will examine plant tissue culture techniques. You will perform sterilization techniques, prepare plant tissue culture media, and produce plant cultures.

Credit unit(s): 2.0
Pre and Co Requisites: PYSL 180, PYSL 181, MICR 282, MICR 283
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine plant tissue culture media components and types of tissue culture.			
2. Demonstrate aseptic techniques while working in a laminar flow hood.			
3. Perform plant callus culture techniques.			
4. Produce micro propagated plants.			
5. Examine plant transformation techniques.			
6. Perform microspore culture techniques.			

LABT 291 - Animal Cell Culture Lab

You will prepare animal cell culture media and materials. You will learn the safe handling and disposal of cell culture materials. You will learn to maintain and subculture cell lines, prepare a primary cell culture and perform cell transfection.

Credit unit(s): 2.0
Pre and Co Requisites: ANAT 183, ANAT 184, MICR 282, MICR 283
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Demonstrate aseptic techniques while working in a biosafety cabinet.			
2. Prepare sterile media and materials used in cell culture.			
3. Compare different cell types in cell culture.			
4. Prepare a primary cell culture.			
5. Set up a primary cell culture.			
6. Manage a cell line project.			
7. Perform a surface volume cell line passage.			
8. Perform a viability count cell line passage.			
9. Perform a transfection of a cell line and monitor transgene expression.			
10. Use equipment in animal tissue culture laboratories.			

MICR 282 - General Microbiology 1

You will be introduced to the diversity of microbiology as an area of bioscience and its unique approaches. You will study the characteristics of microbes including their anatomy, nutrition, growth, and control. Relevant content concerning methods, techniques, and equipment such as microscopes will also be covered.

Credit unit(s): 3.0
Pre and Co Requisites: ANAT 183, ANAT 184, LABT 182, MICR 283
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Differentiate the biological entities studied by microbiologists.			
2. Examine the use of microscopy.			
3. Examine bacterial anatomy and physiology.			
4. Examine the anatomy of archeal cells.			
5. Relate morphological characteristics of bacteria and reactions during staining.			
6. Distinguish the purposes of various types of culture media and techniques.			
7. Examine bacterial growth, reproduction, and metabolism.			
8. Examine environmental factors that affect microbial growth and cultivation.			
9. Compare principles and procedures of microbial control methods.			

MICR 283 - General Microbiology 1 Lab

You will be introduced to standard methods and techniques used in the culture, examination and identification of microbes including molecular techniques. You will study the characteristics of growth and control of microorganisms through application of laboratory methods for cultivation of bacteria. Your laboratory experience will focus on techniques for safely handling, isolating, and identifying bacteria.

Credit unit(s): 3.0
Pre and Co Requisites: ANAT 183, ANAT 184, LABT 182, MICR 282
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Demonstrate technical skills as required in a microbiology laboratory.			
2. Demonstrate biosafety skills as required in a microbiology laboratory.			
3. Collect samples for microbiological examination.			
4. Demonstrate the use of various types of culture media.			
5. Culture a variety of microbes under appropriate conditions.			
6. Perform standard microbiological laboratory procedures/analyses.			
7. Evaluate data from various laboratory analyses.			
8. Apply standard microbiological analyses to identify an unknown microbe.			
9. Develop competence and professionalism in the microbiology laboratory.			

COMM 289 - Communications 2

You will study technical writing and oral presentation skills for the technologist. You will practice research methods, report writing, and oral presentation skills appropriate to the profession.

Credit unit(s): 3.0
Pre and Co Requisites: COMM 191 or TCOM 102
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Conduct research for a technical report.			
2. Create presentation-quality technical reports.			
3. Use graphics technology to illustrate technical reports and presentations.			
4. Present technical information orally.			
5. Develop short reports.			

GENE 287 - Molecular Biology 2

You will study ribonucleic acid (RNA) biochemistry, transcription and its regulation, and RNA Splicing. You will study translation, and protein folding and cellular localization. You will examine regulatory RNA mechanisms of gene expression. You will examine methods in molecular biology and genetic engineering including PCR based techniques, CRISPR genome editing, DNA sequencing and molecular markers.

Credit unit(s): 2.0
Pre and Co Requisites: GENE 285, GENE 286, GENE 288
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Develop job search skills and strategies.			
2. Examine individual differences that impact interpersonal communications.			
3. Develop teamwork skills.			
4. Distinguish effective conflict resolution strategies.			
5. Develop customer relation skills.			

GENE 288 - Molecular Biology 2 Lab

You will use molecular biology techniques to separate, isolate and purify RNA and proteins. You will use PCR based techniques to examine and analyze RNA. You will also purify, and analyze proteins using chromatography, SDS-PAGE, and blotting techniques. You will examine genome content using molecular markers Real time PCR and DNA sequencing. You will use CRISPR technology to engineer a bacterial genome.

Credit unit(s): 4.0
Pre and Co Requisites: GENE 285, GENE 286, GENE 287
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Perform RNA nucleic acid isolation and purification.			
2. Analyze RNA quality using electrophoresis.			
3. Analyze RNA quality using RT-PCR.			
4. Analyze gene expression using qPCR.			
5. Analyze DNA using Real Time PCR.			
6. Perform protein extraction, isolation, and purification.			
7. Analyze proteins using SDS PAGE and blotting techniques.			
8. Analyze recombinant proteins by enzyme assay.			
9. Use CRISPR techniques to engineer a bacterial genome.			
10. Analyze DNA sequences of genome edited bacteria.			

IMMU 179 - Immunology

You will receive an introduction to hematology and study innate and adaptive immunity and how they interact in health and disease. You will perform blood cell enumeration and differentiation and basic immunologic laboratory techniques and discuss their medical applications.

Credit unit(s): 4.0
Pre and Co Requisites: ANAT 183, ANAT 184
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Perform qualitative and quantitative immunoassays.			
2. Perform cell counting and hematological analysis of blood samples.			
3. Examine cellular, molecular, and genetic mechanisms responsible for the function of the immune system.			
4. Examine the cell-mediated branch of the adaptive immune system.			
5. Diagram the anatomy of the immune response.			
6. Examine the structure and biological properties of immunoglobulin.			
7. Examine the mechanisms by which antibody diversity is generated.			
8. Examine the role of vaccines in immunity.			
9. Examine tolerance as it occurs in immunity.			
10. Differentiate immunological disorders.			
11. Examine cancer in terms of an immunopathology.			
12. Examine transplantation immunology.			

LABT 283 - Laboratory Preparation Techniques 2

You will continue applying information and developing skills learned in Laboratory Preparation Techniques 1 (LABT 182). You will prepare materials for first and second year laboratories and apply quality control and assurance to the documentation of laboratory activities. You will demonstrate basic supervisory and leadership skills, operate and maintain laboratory equipment, assist with inventory and perform general laboratory duties.

Credit unit(s): 3.0
Pre and Co Requisites: LABT 182, MICR 282, MICR 283, MICR 284, MICR 285
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Practice professional laboratory behaviour.			
2. Manage a safe, clean, and well-stocked workplace.			
3. Manage standard laboratory equipment.			
4. Prepare solutions and media for specialized laboratory settings.			
5. Perform QA and QC on materials prepared in the laboratory.			
6. Perform calculations as required in laboratory tasks.			
7. Apply elements of quality control and quality assurance to the documentation of laboratory activities.			
8. Apply basic supervisory and leadership skills.			
9. Comply with industry standards and regulations for use and disposal of laboratory materials.			

LABT 292 - Analytical Instrumentation 2

You will study gas chromatography (GC), liquid chromatography (LC), and capillary electrophoresis (CE). You will be introduced to the principles of analytical separation using these instruments and the unique features of having a mass spectrometer (MS) detector. You will examine the applications of the instruments to the field of biotechnology.

Credit unit(s): 3.0
Pre and Co Requisites: LABT 288, LABT 289, LABT 293
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Discuss the basic theory of chromatography.			
2. Examine the components required for gas chromatography (GC) analysis.			
3. Evaluate a GC analysis.			
4. Examine the components and operation of high-performance liquid chromatographs (HPLC).			
5. Examine the application of mass spectrometers in the bioscience industry.			
6. Evaluate an analysis using HPLC, MS or LC-MS.			
7. Relate the use of capillary electrophoresis (CE) to industry.			

LABT 293 - Analytical Instrumentation 2 Lab

You will build on the knowledge learned in Analytical Instrumentation 1. You will evaluate, select, and test instrumentation and equipment appropriate to the chemical analysis.

Credit unit(s): 3.0
Pre and Co Requisites: LABT 288, LABT 289, LABT 292
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Validate the accuracy of analytical instruments applying appropriate quality control procedures.			
2. Create calibration standards and samples for instrumental analysis.			
3. Create calibrations for analytical instruments through the appropriate choice of ESTD, ISTD, matrix matching, and standard addition.			
4. Perform analyses using gas chromatographic equipment.			
5. Perform analyses using liquid chromatographic equipment.			
6. Interpret capillary electrophoresis results.			
7. Interpret chromatographic, electrophoretic, and mass spectra data.			
8. Prepare a training session to operate an instrument.			

MICR 284 - Applied Microbiology

You will study the application of microbiology in bioscience related areas including the environment, food production and preservation, and industrial settings. You will examine several ecosystems and the roles of microbes within them. You will learn about establishing and maintaining culture collections and be introduced to the role of microbes in plant pathology.

Credit unit(s): 3.0
Pre and Co Requisites: MICR 282, MICR 283, LABT 182, LABT 283, MICR 285
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Examine bacterial culture preservation.			
2. Examine methods used in microbial ecology.			
3. Examine the marine and freshwater microbial ecosystem.			
4. Examine the terrestrial microbial ecosystem.			
5. Examine types of microbial interactions.			
6. Explain the role of microorganisms in biogeochemical cycles.			
7. Examine the microbiology of food.			
8. Examine applied environmental microbiology.			
9. Examine the major types of biotic diseases affecting agricultural crops.			
10. Examine various applications of microbiology in industry including bio-reaction processes and industrial fermentation.			

MICR 285 - Applied Microbiology Lab

You will learn how to examine various environmental samples for microbes and be introduced to bioreactor usage. Your laboratory studies will focus on the techniques of sample analysis and include accurate recording, tabulating and analyzing laboratory data to evaluate sample quality.

Credit unit(s): 3.0
Pre and Co Requisites: MICR 282, MICR 283, LABT 182, LABT 283, MICR 284
Equivalent course(s): none

<p>Use a checkmark (P) to rate yourself as follows for each learning outcome</p> <p>Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.</p>	Competent	Learning	None
1. Demonstrate technical skills as required in a microbiology laboratory.			
2. Demonstrate biosafety skills as required in a microbiology lab.			
3. Perform biological analyses of soil samples.			
4. Perform sub-culturing and identification of an unknown fungus.			
5. Perform biological analyses of air samples.			
6. Perform biological analyses of water samples.			
7. Perform biological analyses of milk samples.			
8. Perform biological analyses of food samples.			
9. Perform biological analyses to determine the effectiveness of sanitation.			
10. Evaluate data from various laboratory analyses.			
11. Conduct bench-scale bio-reaction processes.			
12. Demonstrate competence and professionalism in the microbiology laboratory.			

PRAC 285 - Laboratory Practicum

Basic theoretical courses complement more advanced technique-oriented courses where emphasis will be placed on your competency in laboratory skills.

Your practicum consists of working in a private laboratory for four weeks in May. You will not be paid and you must find your own accommodation if you are placed outside of Saskatoon.

Credit unit(s): 8.0
Pre and Co Requisites: GENE 284, MMU 280, LABT 281, LABT 282, LABT 283, MICR 281
Equivalent course(s): none

Use a checkmark (P) to rate yourself as follows for each learning outcome Competent: I can apply this outcome without direction or supervision. Learning: I am still learning skills and knowledge to apply this outcome. None: I have no knowledge or experience related to this outcome.	Competent	Learning	None
1. Demonstrate general and specialized laboratory skills.			
2. Interact effectively with coworkers and preceptors.			
3. Demonstrate computer skills.			
4. Demonstrate general employability skills.			
5. Maintain quality assurance.			
6. Conduct applied research under direction.			