

### 23.0 DEPARTMENT OF SCIENCE

#### 23.0.1 Faculty and Staff

##### Department Head

Herman Michell

Carrie Bourassa

Fidji Gendron

Leanne Stricker

Kim McKay-McNabb

Suzanne Nilson (On leave)

Edward Doolittle (On leave)

##### Staff:

Angela Severight (Administrative Assistant)

Jody Bellegarde (Laboratory Technician)

#### 23.0.2 Location

Regina Campus, Second Floor

1 First Nations Way

Regina, Sask. S4S 7K2

Telephone: (306) 790-5950 Ext. 3325

Facsimile: (306) 790-5993

<http://www.firstnationsuniversity.ca/default.aspx?page=30>

### 23.1 General

The Department of Science at the First Nations University of Canada offers programs and courses leading to four-year university degrees that are fully accredited. Courses in natural sciences, computer science and mathematics, are designed to give First Nations students a maximum level of support and access to a variety of science careers. The science and mathematics courses contain a strong First Nations perspective, and strive to articulate the relevance of the natural and mathematical sciences to contemporary First Nations concerns.

### 23.2 Academic Programs

#### 23.2.1 Bachelor Applied Science (BASc) in Environmental Health and Science

The Department of Science, First Nations University of Canada in partnership with the University of Regina Faculty of Engineering offers a four-year program leading to a Bachelor of Applied Science (BASc) in Environmental Health and Science. The Environmental Health and Science program emphasizes First Nations traditions and culture while providing students with the opportunity to acquire the necessary leadership skills and knowledge needed to address the problems in the areas of environmental health and science. The program is accredited by the Canadian Institute of Public Health Inspectors.

#### 23.2.2 Bachelor of Arts in Resource and Environmental Studies (BARES)

The Bachelor of Arts in Resource and Environmental Studies (BARES) was formed through a partnership between the First Nations University of Canada, the University of Regina Faculty of Arts, and the Saskatchewan Institute of Applied Science and Technology (SIASST), Woodland Campus. This Resource and Environmental Studies degree program provides opportunities to aboriginal and non-aboriginal students with future goals directed toward the successful management of natural resources in Saskatchewan and across Canada. In this unique program you will have the opportunity to learn Indigenous knowledge bases and perspectives, in the context of environment, conservation and natural resource issues.

### 23.2.3 Bachelor of Health Studies (BHS)

The Bachelor of Health Studies (BHS) is offered in partnership with the Faculty of Kinesiology and Health Studies (KHS) and the Faculty of Arts at the University of Regina. This degree program provides an integrated understanding of the ways in which social, economic and cultural determinants of health shape individual beliefs, attitudes and practices and how these affect how individuals function. The degree program is inter-disciplinary in nature, drawing on both the social and biological sciences. A unique feature of the program is its emphasis on understanding Indigenous health needs. There are also applied field-work experience opportunities. The inter-disciplinary nature of the program allows students the flexibility to take courses in a particular area of interest including Indigenous health, population health, kinesiology, psychology, etc.

For more information on the BHS program visit: [www.uregina.ca/kinesiology/health studies](http://www.uregina.ca/kinesiology/health%20studies).

### 23.2.4 Certificate in Indigenous Health Studies

The Department of Science also provides university level courses that satisfy pre-professional requirements for students to enter health-related professions. Students may obtain a Certificate in Indigenous Health Studies, which recognises successful completion of many of these requirements.

### 23.2.5 Admission Requirements

Both general university and Faculty of Science admission requirements are outlined in this calendar's Admission section.

## 23.3 Course Descriptions

### 23.3.1 Biology

#### BIOL 100

##### Introductory Biology I

3:3-3

A survey of the kingdom Animalia and a range of topics including the origin of life, cell structure and function, the diversity of living forms, their ecology, evolution and reproduction.

**Prerequisites:** Biology 30 and Chemistry 30 are strongly recommended. Note: This course is designed for biology majors, pre-professional students, secondary education science students, and those wanting two semesters of biology. Students seeking a single semester introductory course are advised to take Biology 140 or 150.

#### BIOL 101

##### Introductory Biology II

3:3-3

A survey of the kingdoms containing the bacteria, protists, fungi, and plants and including the basic structure, diversity, physiology, ecology, and other characteristics of these organisms.

**Prerequisites:** Biology 100 is strongly recommended. Note: This course is designed for biology majors, pre-professional students, secondary education science students, and those wanting two semesters of biology. Students seeking a single semester introductory course are advised to take BIOL 140 or 150.

#### BIOL 140

##### Human Biology

3:3-3

This course looks at the principles of biology at an introductory level with examples taken from humans. Note: This course is designed for students who do not intend to be biology majors. Students cannot receive credit for both BIOL 140 and 150.

#### BIOL 150

##### Biological Principles

3:3-1.5

This is a survey of basic modern biological principles. Topics include: origin of life, basic cell structure and function, evolution, an outline of organism diversity, ecological principles, and selected functions of multi-cellular organisms. Note: This course is designed for students who do not intend to be biology majors and who are not in pre-professional programs. Students cannot receive credit for both BIOL 140 and 150.

### 23.3.2 Chemistry

#### CHEM 100

##### Introductory Chemistry

3:3-0

This course covers basic principles, to a level approximately equivalent to Chemistry 30; it is intended primarily for science students who require it as background material or as a prerequisite for CHEM 102 or 103. It will serve as a refresher course for those who took high school chemistry some year ago. Note: Persons who have completed Chemistry 30 or equivalent within the last four years, with a grade of 70% or higher, may not take this course for credit, except by permission of the department head.

#### CHEM 102

##### Chemistry

3:3-2

This course extends the treatment of chemical fundamentals: nomenclature, stoichiometry, thermochemistry, and atomic structure. In addition, it covers chemical bonding, molecular geometry, equilibria, kinetics, and thermodynamics. It is a prerequisite for all higher-level courses in chemistry and biochemistry.

**Prerequisite:** Chemistry 30, completed within the last 4 years with a grade of at least 70%, or CHEM 100 with a grade of at least 60% or permission of the department head.

#### CHEM 240

##### Organic Chemistry I

3:3-3

Lectures will discuss the structure, chemistry, and spectroscopy of common functional groups including aliphatic and aromatic compounds. Mechanisms of organic reactions, fundamentals of stereochemistry, and the synthesis of some simple organic compounds will also be discussed. The laboratory will illustrate the fundamental techniques of organic chemistry, including the synthesis and analysis of organic compounds.

**Prerequisites:** CHEM 102 or 103.

#### CHEM 241

##### Organic Chemistry II

3:3-3

The structures, properties, and chemistry of organic compounds possessing the carbonyl function, aromatic compounds (including polyaromatic compounds) and heterocyclic compounds will be discussed. Discussions will also include the description of the preparation of these compounds and their use in organic synthesis. The laboratory will involve the synthesis of aromatic and heterocyclic compounds, and the use of the carbonyl function in organic synthesis.

**Prerequisite:** CHEM 240.

### 23.3.3 Computer Science

#### CS 100

##### Introduction to Computers

3:3-1

Introduction to: the development of computers and computer applications, the impact of computers on society, the computer organization and operation, the construction and representation of algorithms, and the applications of computers in the problem-solving process. Note: This class may not be taken for credit if any class above CS 130 has been successfully completed.

#### CS 130

##### Programming and Problem Solving for Engineering

3:3-1

Introduction to computer organization and operation. Problem-solving techniques using a digital computer. Use of the high level programming languages C and FORTRAN. Problems will be drawn from engineering disciplines.

**Prerequisites:** Mathematics B30 and C30, or permission of the department head. Students will receive credit for only one of CS 110 or CS 130.

### CS 270

#### Management Information Systems

3:3-0

Types, sources and uses of data in organizations. The steps required and the types of equipment available to store and recover data. Analysis of the steps required in the development of a data processing system. Feasibility studies and system analysis techniques. Introduction to data base systems. Management of data processing systems.

**Prerequisites:** CS 100 or 110 or 130 or 170, and ENGL 100.

### 23.3.4 Environmental Health

### ENHS 100

#### Environmental Health and Communications

3:3-0

Instruction and practice in oral and written communication skills pertinent to environment health practice. The course emphasizes life-long learning and public relations in a First Nations context. Topics include: oral presentations; communications in conflict, non-conflict, and management situations; working with the media; effective development of reports, letters, and educational material.

**Prerequisites:** CS 100 and ENGL 100.

### ENHS 101

#### Health Administration

3:3-0

An overview course concerned primarily with major administrative concepts for health professionals.

**Prerequisites:** INHS 101 and ENGL 100.

### ENHS 210

#### International Health Issues

3:3-0

An examination of the organization and delivery of community and environmental health programs internationally, with an emphasis on issues affecting Indigenous peoples in developing countries. Using a case study approach, the the contribution of education, technology, indigenous beliefs and practices, economic and political systems, and foreign aid will be assessed.

**Prerequisites:** INHS 101 and ENHS 100.

### ENHS 300

#### Research Methods for Environmental Health

3:3-0

An introduction to research design and methods with reference to frameworks commonly used in environmental health. Students will read and interpret research literature in environmental health and science. They will gain an understanding of the ethical and practical considerations of the ethical and practical considerations of conducting research particularly in reference to First Nations.

**Prerequisites:** ENHS 210, ENGL 100, and CS 100.

### ENHS 305

#### Environmental Economics and Community Development

3:3-0

Community development and environmental health planning in First Nations are explored with an emphasis on the impact of economic factors on environmental health and science issues. Includes an overview of the principles of environmental economics.

**Prerequisite:** ENHS 210.

### ENHS 310

#### Food Hygiene and Protection I

3:3-0

An introduction to the composition, structure, and properties of food. Topics include an overview of human nutrition, comparative nutritional value of foods, additives, contamination, spoilage, and preservation of food, with a focus on foods such as meat, fish, milk, and milk products. The course emphasizes examples from First Nations settings.

**Prerequisites:** BIOL 220 or 221, and CHEM 240.

- ENHS 311**  
**Food Hygiene and Protection II** **3:3-0**  
 An examination of health protection in the manufacture, preparation, and serving of food in commercial and domestic situations. The course reviews relevant legislation regarding food and food facilities, inspection techniques, hazard analysis, and control strategies. Examples of food handling situations in First Nations settings are provided.  
**Prerequisite:** ENHS 310.
- ENHS 320**  
**Community Health and Epidemiology I** **3:3-0**  
 Introduces the basic principles and methods of epidemiology in environmental health practice including outbreak investigations, the principles and methods of epidemiologic study design, analysis of data and interpretation of results. Examples of communicable and non-communicable disease epidemiology in First Nations are included.  
**Prerequisites:** STAT 151 or STAT 289, BIOL 220 or 221, and KHS 267.
- ENHS 321**  
**Community Health and Epidemiology II** **3:3-0**  
 Students learn to apply epidemiologic principles to gain an understanding of the prevention and control of communicable diseases and environmental health hazards. Emphasis will be placed on communicable disease epidemiology, especially for communicable diseases that are relevant to First Nations.  
**Prerequisite:** ENHS 320.
- ENHS 350**  
**Land Use/Management** **3:3-0**  
 A comprehensive study of land use, land reclamation, development, planning, and reviews. Special attention will be given to issues of importance of First Nations communities.  
**Prerequisite:** ENHS 340 or ENEV 320
- ENHS 380**  
**Environmental Health Research Project I** **3:3-0**  
 An introduction to research design and methods including critical appraisal of environmental health and science research. Students will gain an understanding of ethical and practical considerations of conducting research particularly in reference to First Nations. Includes practical experience in research project development and data analysis.  
**Prerequisites:** ENGL 100, ENHS 320, INHS 210, and CS 100.
- ENHS 401**  
**Water and Wastewater Management** **3:3-0**  
 Introduction to the theory and design of water treatment and distribution systems, wells, cisterns, surface water systems, wastewater treatment and the principles of hydrology and hydraulics. Special attention is given to safe water supply designs for First Nations. The course reviews recreational water maintenance including lakes and swimming pools.  
**Prerequisites:** PHYS 119, and ENEV 321 or ENHS 400.
- ENHS 420**  
**Environmental Health Law and Ethics** **3:3-0**  
 Provides knowledge about the main types of legislation encountered by environmental health personnel including enforcement, evidence collection, appropriate use of regulatory tools, development of prosecution beliefs, prosecution and courtroom procedures. Special attention is given to the current status of and the development of appropriate health regulations for First Nations.  
**Prerequisite:** ENHS 321.

## ENHS 422

### Shelter Environment

3:3-0

Introduction to basic principles of modern shelter and building codes emphasizing plumbing, heating, ventilation, lighting, and chemical and biological hazards associated dwellings, hospitals, schools, offices, nursing homes, campgrounds, and daycares. Land-use planning and environmental health in emergency situations are reviewed. Issues are placed in a First Nations context.

**Prerequisites:** PHYS 119, ENHS 350, and ENHS 435.

## ENHS 430

### Health Concerns in the Workplace Environment

3:3-0

Health and safety hazards found in the workplace environment are studied with special emphasis placed on common occupational health hazards in First Nations. Explores common workplace hazards, their causes and effects, and prevention measures; reviews risk assessment including probability of failure, hazard analysis, human reliability, and risk-based decision making.

**Prerequisite:** ENHS 340 or ENEV 320.

## ENHS 435

### Pest Control

3:3-0

Control of pests, particularly rodents and arthropods which act as vectors in disease spread, with emphasis on diseases significant to First Nations. Chemical and biological pest control methods, their use, cost, regulation, and safety measures are included. The spread and control of vertebrate-borne diseases like rabies and salmonellosis are discussed.

**Prerequisites:** BIOL 220 or 221, and KHS 267.

## ENHS 440

### Environmental Toxicology

3:3-0

An introduction to the basic principles of environmental toxicology, the chemistry and source of toxic substances, human exposure and dose-response relationships. The methodologies, data sources, uncertainties and procedures for risk assessment are covered. The course emphasizes environmental toxins of concern to First Nations.

**Prerequisites:** ENHS 340 or ENEV 320, and KHS 267.

## ENHS 468

### Methodology and Practice

3:3-0

This course, taught primarily by qualified inspectors, will give students an understanding of how inspectors apply knowledge, skills in actual practice. Topics include: biomedical waste management, recreational water quality; swimming pool operation; health education; infection emergency health; report writing; adult care, day care, personal service; and intensive livestock operations.

**Prerequisite:** ENHS 420.

## ENHS 481

### Research Project II

3:3-0

Work begun in ENHS 380 will conclude with a written and oral report. Evaluations from any agencies, governmental departments, or private sector employers will form an integral part of the evaluations.

**Prerequisite:** ENHS 380.

## 23.3.5 Indigenous Health Studies

### INHS 100

#### Introduction to Indigenous Health Studies I

3:3-3

Introduction to health science, emphasizing Indigenous perspectives. Topics: impact(s) of colonization, history of health and health care, theories of health, personal health, consumerism, interpreting health information and statistics, health careers.

### INHS 101

#### Introduction to Indigenous Health Studies II

3:3-3

Introduction to health science, emphasizing Indigenous perspectives. Topics: organization of health services, mental health, nutrition, fitness, sexuality, human relationships, substance abuse, communicable and chronic diseases, aging, environmental health, ethical issues.

**Prerequisite:** INHS 100.

### INHS 200

#### Traditional Indigenous Health Concepts

3:3-0

Traditional health concepts of Indigenous peoples, emphasizing the Indigenous peoples of North America. The history, evolution, and relevance of traditional beliefs to contemporary health care and health issues.

**Prerequisites:** INHS 100 and 101 or two Indian studies courses.

### INHS 210

#### Contemporary Issues in Indigenous Health

3:3-0

An in-depth examination of contemporary issues in Indigenous health, including community planning, major health issues, government policy, Indigenous control of health care, human resource development, and alternative models of delivery in Canada.

**Prerequisites:** INHS 100 and 101.

### 23.3.6 Mathematics

### MATH 101

#### Introductory Finite Mathematics I

3:3-0

This is an introductory course intended to familiarize the students with the basic concepts of arithmetic, number theory, set theory, symbolic logic and finite mathematics. Topics include log, sets, numeration systems, arithmetic in non-decimal systems, system of integers, elementary number theory and modular arithmetic. There will be a strong emphasis on critical thinking, problem solving, understanding concepts and their applications. Students who have already received credit for any university mathematics course (other than MATH 108) cannot take MATH 101 for credit, unless it is explicitly required in their program or they have received consent from the Head of the Department of Mathematics and Statistics.

**Prerequisite:** Mathematics A30.

**Note:** Mathematics 101 is not algebra, nor pre-calculus, nor calculus. It satisfies the critical thinking requirement in the Faculty of Arts and is required by students in the elementary education program. Mathematics 101 leads to Mathematics 127.

### MATH 103

#### Calculus for the Social & Management Sciences

3:3-0

Differentiation of algebraic, exponential, and logarithmic functions. Optimization, curve sketching, integration by substitution.

**Prerequisite:** Mathematics B30 with a grade of at least 65%. Note: This is a terminal course in calculus.

Students who wish to take further calculus courses should initially take MATH 105 or 110. Students can receive credit for only one of MATH 103, MATH 105, and MATH 110.

### MATH 104

#### Calculus I (a)

3:3-0

This course carries no credit. MATH 104 and MATH 105 cover the same material as is covered in MATH 103 and 110, supplemented by a brief review of necessary topics from high school algebra and geo-trig.

**Prerequisites:** Mathematics B30 and C30. Note: This is a course for students who wish to take MATH 110 or MATH 103 but do not have the prerequisites, or want a slower introduction to calculus. To receive credit for MATH 105 a student must register in the same numbered sections of MATH 104 and 105 in consecutive semesters.

## **MATH 105**

### **Calculus I (b)**

**3:3-0**

This course is a continuation of MATH 104. Together with MATH 104 topics include a review of high school algebra and trigonometry, and all the topics covered in MATH 103 and MATH 110.

**Prerequisite:** The same section of MATH 104 in the previous semester. Note: MATH 105 is intended to satisfy any MATH 103 or 110 requirement. Students can receive credit for only one of MATH 103, 105, and 110.

## **MATH 110**

### **Calculus I**

**3:3-1**

An introductory course in the theory and techniques of differentiation and the integration of algebraic and trigonometric functions. Topics covered include limits, optimization, curve sketching and areas.

**Prerequisites:** Mathematics B30 and C30 with a grade of at least 65% in each. It is strongly recommended that students with less than 80% in Mathematics B30 and C30 register in MATH 104. Note: Students can receive credit for only one of MATH 103, MATH 105, and MATH 110.

## **MATH 111**

### **Calculus II**

**3:3-1**

Differentiation and integration of logarithmic, exponential and inverse trigonometric functions. Methods of integration. Indeterminate forms, l'Hospital's rule and improper integrals. Volumes of revolution. Infinite sequences and series. Taylor and MacLaurin series.

**Prerequisite:** A grade of at least 60% in either MATH 105 or 110.

### **23.3.7 Adult Mathematics**

## **AMTH 001**

### **Mathematics I**

**3:3-2**

An introduction to algebra, this course is the first of two courses required to meet the algebra requirement of courses at the University of Regina. This course is not a pre-requisite for any university level mathematics course.

**Prerequisite:** None.

## **AMTH 002**

### **Mathematics II**

**3:3-2**

A continuation of Mathematics I, this course meets the algebra requirement of courses at the University of Regina.

**Prerequisite:** AMTH 001 or a minimum score of 65% in the Mathematics Placement Test.

## **AMTH 003**

### **Mathematics III**

**3:3-2**

This course meets the geometry and trigonometry requirement of courses at the University of Regina. Pre- or Corequisite: Algebra 30, Math B30 or AMTH 002.

### **23.3.8 Physics**

## **PHYS 109**

### **General Physics I**

**3:3-1.5**

General algebra based physics, including classical mechanics and geometrical optics. May not be taken for credit if a student has received credit for PHYS 111 or PHYS 112.

**Prerequisites:** Mathematics B30 and C30. Note: Students cannot receive credit for both PHYS 105 and 109.

## **PHYS 119**

### **General Physics II**

**3:3-1.5**

A continuation of PHYS 109: Fluid mechanics, heat and thermodynamics, waves, sound, radiation, electrostatics and electric current. May not be taken for credit if a student has credit for PHYS 111 or 112.

**Prerequisite:** PHYS 109 or ENGG 140.

### 23.3.9 Statistics

#### STAT 151

#### Statistical Methods I

**3:3-0**

An introductory course in statistical methods, including descriptive statistics, bivariate data, probability, and statistical inference.

**Prerequisite:** Algebra 20 or Mathematics A30. Note: Students may not receive credit for this course if they have received credit for EPSY 320, SOST 201 or STAT 289.