



**CCNM**

Canadian College of  
Naturopathic Medicine

**COURSE OUTLINE  
SBI102**

|   |                               |
|---|-------------------------------|
| <b>Course:</b>                          | Biology                       |
| <b>Course Code:</b>                     | SBI102                        |
| <b>Times &amp; Location:</b>            | On-line                       |
| <b>Course Coordinator:</b>              |                               |
| <b>Instructors/Teaching Assistants:</b> | Juana M. Gonzalez-Santos, PhD |
| <b>E-mail:</b>                          | Jgonzalez-santos@ccnm.edu     |
| <b>Office Hours:</b>                    |                               |
| <b>Office Location:</b>                 |                               |

**Evaluation:**

|                                    | PERCENT | TEST DATE / DUE DATE |
|------------------------------------|---------|----------------------|
| <b>10 Quizzes</b>                  | 10      | Two quizzes per week |
| <b>1 Assignment</b>                | 5       | TBA                  |
| <b>Tutorials</b>                   | 5       | Weekly               |
| <b>Midterm Test (online)</b>       | 30      | TBA                  |
| <b>Final Exam (with a proctor)</b> | 50      | TBA                  |

Plagiarism and cheating are academic offenses and will be treated seriously by the College. Students should refer to the College's policies on academic misconduct posted on in the [Academic Calendar](#).

## **Course Description**

Human Biology (SBI102) is a 3-credit, 8-week introductory course that will provide students with a solid core foundation in basic and applied human biology. Through on-line self-study modules, tutorials, quizzes, exercises, and assignments, students will learn to use relevant terminology and concepts in a biological context. The course will introduce the structure and function of tissues and organ systems.

Students will have complete weekly on-line self-study modules and will interact online with the course instructor one evening a week in an on-line tutorial session. Students are expected to be prepared for these tutorial sessions (i.e. have completed the on-line modules), and will be graded using a variety of assessments including quizzes, tests, assignments/labs, and a final exam. Most of the assigned material will come from the required course textbook.

The application of biology fundamentals to naturopathic medicine is integrated throughout the course, providing students with a unique opportunity to learn biology within the context of naturopathic medicine.

## **Course Outcomes:**

This course is designed to:

- A core foundation for their knowledge of cellular and molecular biology
- The basis for applying biological concepts to the human body
- Use the relevant vocabulary and concepts correctly in a biological and clinical context
- Acquire an understanding of the known mechanisms by which the cells and organisms function and achieve homeostasis
- Challenge and engage the student where he/she may independently work to enrich their learning.
- Equip students with the necessary knowledge to enter the ND program. Where applicable, apply human biology to Naturopathic principles.

## **Required Texts:**

Goodenough, Judith, McGuire, Betty. *Biology of Humans; Concepts, Applications and Issues*. San Francisco, 2016, Sixth Edition.

## **Recommended Texts and other readings:**

Any first year university or introductory biology or physiology text will prove to be a useful reference. Selected PowerPoint slides from lectures, supplementary resources, and assignments will be weekly posted in Moodle.

**Prerequisites:**

There are no prerequisites required for this course.

**Course Format:**

Each course is delivered in a blended learning style which combines online self-study modules with weekly live interactive online tutorial sessions from 7:30 - 9 p.m. ET (one evening per week) with the course instructor. The passing grade is 60% and evaluations/assessments will consist of tutorial attendance/participation (5%), one quiz per module (10%), one assignment (5%), as well as one midterm exam (30%) and a final exam (50%) which can be completed online and will be proctored via remote invigilation.

**Biology (SBI102) Schedule**

| Module | Topics                    | Activities | Due Date | Resources         |
|--------|---------------------------|------------|----------|-------------------|
| 1      | The Nervous System        | Quiz 1     | TBA      | Chapter 8         |
| 2      | Sensory System            | Quiz 2     | TBA      | Chapter 9         |
| 3      | The Endocrine System      | Quiz 3     | TBA      | Chapter 10        |
| 4      | Blood                     | Quiz 4     | TBA      | Chapter 11        |
| 5      | The Cardiovascular System | Quiz 5     | TBA      | Chapter 11 and 12 |
| 6      | Body Defense Mechanisms   | Quiz 6     | TBA      | Chapter 12 and 13 |
| 7      | The respiratory System    | Quiz 7     | TBA      | Chapter 14        |
| 8      | The Digestive System      | Quiz 8     | TBA      | Chapter 15        |
| 9      | The Urinary System        | Quiz 9     | TBA      | Chapter 16        |
| 10     | The Reproductive System   | Quiz 10    | TBA      | Chapter 17        |
| 11     | Review                    |            |          |                   |

## **Biology (SBI102) Learning Outcomes**

### **Module 1: The Nervous System (Chapter 8)**

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Compare the functions of the central and peripheral, somatic and autonomic, and parasympathetic and sympathetic divisions of the nervous system.
- Identify the location and list the function of each component of the central nervous system.
- Describe the function of the somatic and autonomic nervous systems and the sympathetic and parasympathetic nervous systems.
- Explain the cause and seriousness of common health problems and injuries of the nervous system.

Focus on: Drugs and the Mind

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Describe the mechanism of psychoactive drugs.
- Differentiate between tolerance, cross-tolerance, and physical tolerance.
- List the effects of alcohol on the various body systems, nutrition, cancer, and fetal development.
- Explain the effects of THC and the long-term effects of marijuana on the body.
- List the stimulants described in the chapter and describe how each of these stimulants acts on the CNS.
- Describe the danger of hallucinogenic drugs.
- Compare the positive and negative aspects of opiates.

### **Module 2: Sensory System (Chapter 9)**

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Explain the term sensory receptors.
- List the five classes of sensory receptors and their stimuli.
- Differentiate between general senses and special senses.
- Label the parts of the eye and explain the function of each part in the perception of sight.
- Label the parts of the ear and describe the role of each part in hearing.
- Explain how we perceive and maintain balance.
- Describe the mechanism of taste buds and olfactory receptors.

### **Module 3: The Endocrine System (Chapter 10)**

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Explain the role of hormones as chemical messengers and give an example of hormone regulation.
- List the effect of each of the six anterior pituitary hormones and the two posterior pituitary hormones.
- Describe the effect of thyroid hormone, including oversecretion and undersecretion.
- Explain the regulation of blood calcium by calcitonin and parathyroid hormone.
- Name and describe the effects of the hormones produced by the adrenal gland.
- Compare the effects of the two pancreatic hormones, glucagon and insulin, on the regulation of glucose blood level.
- Describe the effect of the thymus gland on the health of the immune system.
- Relate the production of melatonin to seasonal affective disorder and name the gland that is involved.
- Define prostaglandins and describe their mechanism of action as compared with endocrine hormones.

Focus on: Diabetes mellitus

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- List the four types of diabetes, their characteristics, and their prevalence.
- Distinguish between type 1 and type 2 diabetes in terms of their symptoms, diagnosis, treatment, and prognosis.
- Summarize the symptoms, diagnosis, and treatment of gestational diabetes, emphasizing the unique characteristics.

### **Module 4: Blood (Chapter 11)**

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- List the functions of blood.
- Describe the composition of blood and the function of platelets, red blood cells, and each type of white blood cell.
- Explain the cause and treatment of the various types of anemia and leukemia.
- Explain how antibodies and antigens determine blood type and transfusion relationships.
- Sequence the steps leading to a blood clot.

### **Module 5: The Cardiovascular System (Chapter 12)**

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- List the functions of the cardiovascular system.
- Compare the structure of arteries, veins, and capillaries and explain how the structure facilitates the function of each type of vessel.
- Contrast the exchange of gas in the pulmonary and systemic circuits.
- Describe the internal conduction system of the heart and the resulting cardiac cycle.
- Define blood pressure and differentiate between systolic and diastolic pressure.

## Focus on: Cardiovascular Diseases

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Answer the question: Why is cardiovascular disease important to understand?
- Distinguish between a thrombus and an embolism and explain their dangers and treatment.
- Describe hypertension and atherosclerosis, explain why they are life-threatening, and present treatment options including lifestyle changes.
- Differentiate between a heart attack and progressive heart failure.
- Provide specific data on the impact of cigarette smoking on cardiovascular disease.
- List heart-healthy lifestyle habits.

## **Module 6: Body Defense Mechanisms (Chapter 12 and 13)**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Describe the functions and structures of the lymphatic system.
- Use the word pathogen to explain why our body needs a defense mechanism.
- Describe in detail each of the three lines of defense.
- Define antigen and MHC markers and explain their role in cell identity.
- Compare an antibody-mediated immune response with a cell-mediated immune response.
- List the steps in an adaptive immune response, the cells that are involved, and the mechanism of defense.
- Differentiate between active and passive immunity.
- Describe monoclonal antibodies and list some of their uses.
- Explain the cause of autoimmune disorders and the development of an allergic reaction.

## Focus on: Infectious Diseases

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Define pathogen, list the pathogens discussed in the chapter, and provide an example of each.
- List the mechanisms by which disease can be spread.
- Define epidemiology, sporadic diseases, endemic diseases, epidemic disease, and pandemic.

## **Module 7: The respiratory System (Chapter 14)**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- List the four functions of the respiratory system. List the organs/structures of the respiratory system, and explain their role in gas exchange.
- Explain how inhalation and exhalation are accomplished, including the muscles that are involved and the changes in air pressure.
- Describe how oxygen and carbon dioxide are carried in the blood and exchanged within the tissues.
- Discuss the respiratory control centers in the brain and how the level of blood gases affects breathing rate.
- Identify various disorders of the respiratory system, including their symptoms and treatment.

## **Module 8: The Digestive System and Nutrition (Chapter 15)**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Describe the passage of food through the gastrointestinal tract from the mouth to the anus.
- Explain the function of each organ and accessory organ of the digestive system and describe any specialized structural features.
- Compare neural and hormonal control of digestion and give examples of each.
- Describe a well-balanced diet as represented by MyPlate.
- State the dietary value of lipids, carbohydrates, proteins, vitamins, minerals, and water.
- List the information found on a food label and explain how that information can help you make healthy choices.
- Explain how the body uses energy and what happens to excess food calories.
- Define the Body Mass Index (BMI), explain how it can be used to determine a desirable weight, and then explain the risks of being overweight.
- Describe the characteristics of successful weight-loss programs.
- Compare obesity, anorexia nervosa, and bulimia and explain how they are serious health risks.

### Focus on: The Obesity Epidemic

#### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Describe obesity, including an explanation of the Body Mass Index (BMI).
- Discuss the health risks of obesity, including possible cardiovascular problems, the incidence and implications of Type 2 Diabetes, and cancer.
- Describe the regulation of food intake as governed by the hypothalamus, hormones, and epigenetics.
- Explain the components of weight management and the yo-yo effect of weight loss and gain.

## **Module 9: The Urinary System (Chapter 16)**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- List the organs and systems that eliminate waste.
- Identify and give the function of each of the organs of the urinary system.
- Explain the role of the kidneys in maintaining homeostasis in the body.
- Describe the structure of the nephron and the processes of glomerular filtration, tubular reabsorption, and tubular secretion.
- Explain the role of the kidney in the maintenance of acid-base balance, red blood cell production, activation of vitamin D, and water conservation including the relevant hormonal control.
- Differentiate between acute and chronic renal failure and describe the processes of dialysis and kidney transplant surgery.
- Explain the voluntary and involuntary components of urination and the causes of urinary incontinence.
- Name various urinary tract infections and identify common causes of these infections.

## **Module 10: The Reproductive System (Chapter 17)**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- State the function of the gonads.
- Compare and contrast the roles of the male and female in reproduction.
- Describe the function of each organ of the male reproductive system, the development of sperm, the formation of semen, and hormonal control of male reproduction.
- Describe the function of each organ of the female reproductive system; the ovarian and uterine cycles and the interplay between them; and the hormonal control of the female reproductive system.
- Explain the causes and symptoms of health problems of the female reproductive system.
- List the stages involved in the human sexual response and the physiological changes that accompany them.
- Name each method of birth control presented in the chapter and explain how it works, why it prevents pregnancy, and its relative effectiveness.

## **Focus on: Sexually Transmitted Diseases and AIDS**

### Learning Objectives

After reading the textbook and studying the material in this chapter, the student should be able to:

- Describe the long-lasting effects of STDs and STIs.
- Differentiate between the treatments and/or cures for STDs caused by bacteria and for those caused by viruses.



- Develop a table listing the symptoms, causative organisms, and treatments of chlamydia, gonorrhea, syphilis, genital herpes, and genital warts.
- Explain the progression of an HIV infection and its diagnosis as AIDS.