

## COURSE OUTLINE SUMMER 2021

<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>	Philippe D'Onofrio, Ph.D.
<b>E-mail:</b>	pdonofrio@ccnm.edu philippe.donofrio@gmail.com

### 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.

### 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).

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.

### **Prerequisites:**

There are no prerequisites required for this course.

### **Course Format:**

The course is delivered in a **blended learning style** which combines online self-study modules with weekly live interactive **online tutorial sessions from 7:30 p.m. - 9 p.m. EST** (one evening per week) with the course instructor. The passing grade is 60%, and **evaluations/assessments** will consist of **one quiz per module (10%), one assignment (5%), one midterm test (35%), and a final exam (50%)**. Both the midterm test and the final exam are invigilated at CCNM's testing centre, or under the guidance of a suitable invigilator (college/university or secondary school academic professional, librarian, or testing centre) in your local area.

### **Course Outcomes:**

This course is designed to:

- Establish a core foundation for students' knowledge of cellular and molecular biology
- Establish the basis for applying biological concepts to the human body
- Impart the relevant vocabulary and concepts correctly in a biological and clinical context
- Give students an understanding of the known mechanisms by which the cells and organisms function and achieve homeostasis
- Challenge and engage students 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.

### **Evaluation:**

TASKS	PERCENT	DUE DATES
<b>10 Quizzes</b>	10	Two quizzes per week
<b>1 Assignment</b>	5	June 22, 2021
<b>Midterm Test</b>	35	May 25, 2021
<b>Final Exam</b>	50	June 22, 2021

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. Students may seek guidance from various style manuals located in the CCM library.

### Biology (SBI102) Schedule

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

The Academic Department reserves the right to make schedule changes.

## 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.

