

*This syllabus is a general representation of the course as previously offered and is subject to change.*

## **BIOL 153 – Human Biology: Anatomy and Physiology & BIOL 155 – Human Biology: Physiology and Introductory Anatomy**

General Course Syllabus (as of August 2019)

### **About the Course:**

**Course Description:** The principles of biology with particular reference to the human body (anatomy and physiology). Please consult the [Faculty of Science Credit Exclusion Lists](#).

- **BIOL 153 (8 credits)** is designed for, but not restricted to, students in Dental Hygiene, Midwifery, Food & Nutrition Science, and students applying for entry into the School of Nursing. Lectures cover basic concepts in biology and human physiology, and the importance of interactions between organ systems to maintain homeostasis. The laboratory component emphasizes the relationship between structure and function of the human body, with selected experiments on organ physiology, human response to environmental changes, and general anatomy.
- **BIOL 155 (6 credits)** is the lecture-only version of this program. As such, it is primarily a foundational course in human physiology, suitable for students in General Sciences, Biology, and as a preparatory course for the Health Sciences, including Medicine and Dentistry (BIOL 155 is not a pre-requisite for these programs). The focus is to study human physiology and understand how physiological changes enable the human body to adapt to varying environmental challenges.

**Course Format:** The course spans two academic terms from September through April.

- BIOL 153: Lecture (3h/week), Laboratory (3h/week), and Tutorial (1h/week).
- BIOL 155: Lecture (3h/week).

**Credits:** 8 credits for BIOL 153; 6 credits for BIOL 155.

**Pre-requisites:** One of CHEM 12, CHEM 100, CHEM 111 and one of BIOL 11, BIOL 12, BIOL 111.

### **Course Learning Objectives:**

By the end of this course, students should be able to:

- Develop a thorough understanding of fundamental concepts in human physiology, interactions between major physiological systems, and the effects of selected pathological conditions on the function of these systems and their specific organs.

- Develop a solid knowledge of human anatomy including the understanding of the cause-effect relationship between structure and function of tissues, organs, and systems.
- Think critically about the importance and impact of physiology of the human body on the nursing practice.
- Demonstrate a high degree of maturity and professionalism expected of future health care professionals.

### Textbooks and Additional Resources:

- **Required Text:** Martini, F. H. "Visual Anatomy & Physiology", 2nd Ed.
- **Required Equipment:**  
3-ring binders to file lecture notes, lab notes, and lab reports.  
USB drive or memory stick for saving lab data.
- **Optional (but highly recommended) Text:** Medical Dictionary

Note: Although the internet has become a major source of scientific information students should remember that, unlike scientific papers or textbooks, most web sites do not undergo the process of peer review. Consequently, never assume that everything posted on the web is correct, and when surfing the net choose web sites that belong to well-established institutions such as major colleges and universities.

### Evaluation:

The distribution of marks in **Biology 153** is as follows:

Assessment	Weight
Mid-term exams (one in each term; 2 x 10% each)	20%
Winter exam	20%
Final Exam	20%
<b>Lecture Total</b>	<b>60%</b>
Physiology lab reports	20%
Pre-lab and Anatomy quizzes	20%
<b>Lab total</b>	<b>40%</b>
<b>Course total</b>	<b>100%</b>

**NOTE:** For Biology 153, students must pass both the lecture and lab components to pass the course (for the Faculty of Science, a minimum of 60% is required to pass). Attendance in the labs is mandatory and a mark of 0% will be given for missed labs. Late lab reports will be docked 10% per day late.

**Biology 155** marks will be based solely on the lecture exams, which will be weighted as follows:

<b>Assessment</b>	<b>Weight</b>
Mid-term exams (one in each term; 2 x 15% each)	30%
Winter exam	35%
Final Exam	35%
<b>Course total</b>	<b>100%</b>

## **Schedule of Topics:**

### Term 1 Lecture Outline (sample from 2018W):

- **Introduction:** Basic review of vertebrate and human evolution. Basic chemistry review.
- **Cell Structure and organelle function.**
- **Nervous System:** Organization of Nervous Tissue; Resting Membrane Potentials and Graded Potentials; Action Potentials; Ionic basis of Action Potential, channel cycling and refractory periods; Propagation of Action Potentials; Synapses and synaptic transmission; Integration at Postsynaptic Membranes; Neural Integration; Neuronal Circuits; Special senses.
- **Skeletal Muscle:** Microanatomy; Mechanism of Contraction; Contraction in Whole Muscles; Factors Affecting the Force of Contraction; Reflex Activity.
- **Endocrine System:** Overview; Hormones; Mechanisms of Hormone Action; The Pituitary Gland and Its Hormones; The Thyroid and Parathyroid Glands; The Adrenal Gland; The Endocrine Pancreas.
- **Reproductive System:** Determination of Sex; Sexual Development; Endocrinology of Male Reproduction; Endocrinology of the Ovarian cycle; Fertilization and Pregnancy; Endocrinology of Pregnancy; Labour and Delivery Cycle.

### Term 2 Lecture Outline (sample from 2018W):

- **Cardiovascular System:** Heart Physiology; Cardiac Action Potential and Cardiac Contraction; Conduction Pathway and Pacemaker Cells; Cardiac Cycle and Cardiac Output; Regulation of Cardiac Output; Control of Blood Pressure.
- **Physiology of the Circulation:** Physical Principles of Blood Flow; Capillary Exchange; Control of Tissue Blood Flow; Short Term Regulation of Blood Pressure.
- **Blood:** Composition of blood; Blood types; White blood cells and Red blood cells.
- **Immunology:** The lymphatic system; Inflammation; Innate and Acquired immunity; Lymphocyte development and selection; Vaccines.

- **Respiratory System:** Mechanics of Breathing; Boyle's Law and Pulmonary Ventilation; Airway Resistance and Breathing; Gas Exchanges Between the Blood, Lungs, and Somatic Tissues; Transport of Oxygen and CO<sub>2</sub> by Blood; Role of Respiration on Blood pH.
- **Digestive System:** Regulation of Gastric Secretion; Gastric Motility and Emptying; Role of the Small and Large Intestines in Digestion; Chemical Digestion and Absorption; Metabolic Events of the Absorptive State; Role of the Liver in Metabolism.
- **Urinary System:** General anatomy of the kidney; Glomerular Filtration; Regulation of Glomerular Filtration; Tubular Re-absorption; Regulation of Urine Concentration and Volume; Creation and Role of the Medullary Osmotic Gradient; Electrolyte regulation.
- **HIV Lecture.**

Laboratory Outline (sample from 2018W):

Lab Week	Lab Topic
1	Introduction and Histology
2	Cell Permeability
3	Surface Anatomy
4	Spinal Cord, Spinal Nerves, and the Autonomic Nervous System
5	<b>No labs this week</b>
6	Physiology of the Eye and Special Senses
7	Joints and Body Movement
8	Muscle Physiology
9	Muscle Reflex Physiology
10	<b>No labs this week</b>
11	Gross Anatomy of the Muscular System
12	Gross Anatomy of the Muscular System (cont.)
	<b>Winter Break</b>
13	<b>No labs this week</b>
14	Human Vascular System
15	Cardiovascular Physiology
16	Blood
17	Lymphatic System Anatomy
18	Respiratory Anatomy
19	<b>No labs this week</b>
20	Physiology of the Respiratory System
21	Anatomy of the Digestive System
22	The Digestive Physiology
23	Anatomy of the Renal System
24	Renal Physiology

## **University Policies:**

*UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence.*

*UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.*

*UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.*

*UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.*

*Details of the policies and how to access support are available on [the UBC Senate website](#).*