Bergen Community College
Division of Mathematics, Science, and Technology
Department of Biology and Horticulture

Introduction to Human Biology (BIO-107)

General Course Syllabus

Course Title: Introduction to Human Biology (BIO-107)

Course Description: This course is a human anatomy and physiology course intended for the non-biology major. Biological principles are taught by examining human body systems, homeostasis, and disease. This information, relevant because it applies to their own bodies, will help students understand medical issues, appreciate the importance of exercise and nutrition in maintaining health, and consider environmental concerns including the health effects of pollution and overpopulation. Laboratory exercises include experimentation, microscopy, and dissection.

Prerequisites: None

General Education: Yes

Course Credits: 4.0

Hours per week: 6.0: 3 hours lecture and 3 hours lab

Course Coordinator: Coleen DiLauro

Required Lecture Textbook: Goodenough, J., and McGuire, B., **Biology of Humans, Concepts, Applications, and Issues,** 6th Edition, Pearson, NJ, 2017
ISBN: 9780134045443

***Required Laboratory Manual:** Marty Lowe, **Human Biology, Laboratory Manual**, 2nd Edition, **Kendal/**Hunt 2007. ISBN: 9781465299376

Materials: **All students must wear protective eyewear, vinyl gloves and laboratory coats.**

*** DO NOT, UNDER ANY CIRCUMSTANCES, PURCHASE A USED LABORATORY MANUAL**

Student Learning Objectives

The student will be able to:

1. Explain the scientific and biological foundations of anatomy and physiology and examine the role of the scientific method in obtaining knowledge. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

2. Describe the organization of the human body, including body symmetry, planes, directional terms, regions of the body and body cavities. Distinguish the levels of organization in the body including cells, tissues, organs, and organ systems. Summarize the concept of homeostasis.

3. Examine the principles of the Cell Theory. Identify the parts of the cell including the plasma membrane, cytoplasm, and organelles, and explain their functions. Explain how substances are transported through cell membranes. Summarize the production of energy by the cell. Describe the molecular structure of DNA and RNA. Investigate the complementary nature of the strands of DNA. Apply a basic understanding of the Central Dogma concept. Paraphrase the process of protein synthesis. State the stages of cell division and describe the events that occur. Analyze how mutations happen. Students will model and practice the proper use of a microscope.

4. Express an understanding of the principles of Human Genetics. Explain disorders associated with sex-linked inheritance including color-blindness and hemophilia. Investigate chromosome abnormalities including Down's syndrome, Turner's syndrome and Klinefelter Syndromes.

5. Examine the role of the Integumentary System in covering and protecting the body, receiving sensory information, and controlling body temperature. Examine skin cancer and acne.

6. Summarize the functions of the Skeletal System. Describe the microscopic structure of a long bone. Identify the types of bone cells. Identify major bones in the Axial and Appendicular divisions of the skeleton. Explain types of fractures and how bone is repaired. Describe common disorders of the skeletal system.

7. Examine the functions of the muscular system. Distinguish between the three types of muscle. Explain how a muscle contracts. Apply correct terminology to describe the actions of muscle. Be able to identify major muscles in the body. Be able to point out major principles of exercise physiology. Explain the effects of exercise on body physiology. Research the benefits of exercise and be aware of precautions concerning exercise.

8. Generalize the functions of blood. Describe the cells found in blood and explain their purpose. Explain the basis of human blood groups. Explain how blood coagulates. Compare disorders associated with blood including anemia and leukemia and hemophilia.

9. Describe the structure and function of arteries, veins, and capillaries. Analyze disorders such as atherosclerosis and hypertension, their causes and control. Describe the functions of the Pulmonary and Systemic divisions of the circulation. Explain how blood pressure is measured.

10. Describe the structure and function of the heart. Identify the chambers of the heart and the heart valves. Explain the operation of the conduction system of the heart. Explain the coronary vessels that supply blood to the heart. Describe the sequence of events that result in the pumping of blood by the heart. Explain how a heart attack occurs. Survey the causes and treatment of cardiac disease. Examine risk factors associated with heart disease.

11. Explain the lymphatic system structure and function and it role in defense against disease causing organisms. Describe the disorder lymphoma.

12. Recognize the importance of the Immune System in protecting us against disease. Identify the components of the immune system and investigate their roles in the immune response.

13. Analyze the nature and causes of infectious disease. Provide a general classification of organisms that are responsible for causing disease. Use selected diseases as examples to explain how pathogens are transmitted, how diseases are diagnosed, and how diseases may be controlled. Recognize the seriousness of current epidemics such as AIDS and emerging diseases. Assess concerns over Biological Warfare and Bioterrorism.

14. Explain the structure and function of the components of the respiratory system. Explain the mechanism of breathing. Describe the process of gaseous exchange in the lung and tissues. Identify common respiratory diseases and their effects. Recognize the effects of smoking. Point out the harmful effects of air pollution on the respiratory system.

15. Identify the functions of the Urinary System. Describe the structure of the kidney. Describe the structure of the nephron and the structure of the excretory passages. Explain how urine is formed. Investigate peritoneal dialysis, hemodialysis and renal transplantation.

16. Describe the structure and function of the digestive system. Explain the process of digestion. Classify the causes of selected digestive disorders and diseases including ulcers, hepatitis, and appendicitis. Describe the value of good nutrition in maintaining health and well-being. Research the role of carbohydrates, lipids, and protein in providing nutrition and examine the importance of vitamins and minerals in nutrition. Describe the effects of vitamin deficiencies. Explain how calories are used to measure energy. Examine appetite and weight control. Analyze Eating Disorders and the dangers of Food Contamination.

17. Identify the divisions of the nervous system. Explain the structure and function of the components of the nervous system. Describe the structure of nerves and the generation of the nerve impulse. Describe the parts of the brain and their functions. Explain the path of impulses in a reflex arc and the path that information would flow from a sensory receptor to the brain and how motor information would flow from the brain to muscle.

18. Identify the structure and function of receptors involved in the reception of general sensation including proprioceptors, pain receptors, touch receptors, pressure receptors and receptors for temperature. Generalize the structure and function f the structures responsible for the special senses of vision, hearing, olfaction, taste and equilibrium. Research the effects of drugs on the mind including caffeine, nicotine, and alcohol. Survey the effect of hallucinogenic drugs. Examine the misuse of prescriptive drugs. Point out the consequences of addiction to cocaine and narcotics.

19. Investigate the role of the Endocrine System in controlling body functions. Explain what a hormone is. Explain disorders of oversecretion or undersecretion of hormones.

20. Investigate the response to stress elicited by the nervous system and endocrine system.

21. Describe the structure and function of the reproductive organs. Analyze the hormonal control of the menstrual cycle and describe the progression of the cycle. Describe the process of fertilization, pregnancy and birth. Examine sexually transmitted diseases. Explain methods used for contraception.

22. Investigate environmental problems associated with human population growth.

23. Analyze case studies and formulate differential diagnoses through online programs. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

24. Students will be able to research a topic using scientific literature, determine valid sources relevant to a topic, and incorporate sources to write a paper with correct documentation.

Student Assessment Tools:

The above student learning objectives will be generally assessed or evaluated by instructors using a variety of **assessment instruments** including **lecture exams**, **laboratory exams**, **quizzes**, **laboratory reports**, **written reports**, **presentations**, **projects**, **etc**. The decisions concerning the type or types and number of instruments that are used in a specific section of the course will be left to the instructor of that section. This information, when given by the instructor should be recorded by the student in the **Student Assessment Section** of this document.

Course content:

Lecture Topics:

Unit	Topic	Chapter
1	Introduction to Human Biology Definitions of Anatomy and Physiology. Scientific Basis of Human Biology and the Scientific Method. Characteristics of Living Things and the Levels of Organization. Terms used in describing body structure and body cavities. The concept of homeostasis.	1
2	The Structure and Function of Cells and Human Genetics Prokaryotic and Eukaryotic Cells. Plasma membrane, cytoplasm, organelles and their functions. DNA, RNA, protein synthesis and the Central dogma. Transport of substances across the cell membrane. Production of energy by the cell. Cell division-Mitosis, meiosis and mutations. Human Genetics. Inheritance of blood types. The Sex Chromosomes and Sex-Linked Inheritance-Color-blindness and Hemophilia Chromosome Abnormalities-Down's Syndrome Turner and Klinefelter Syndrome. Principles of Microscopy.	3, 19, 20
3.	The Integumentary System Structure and function of the skin. Derivatives of the skin. Skin Color. Skin Disorders-skin cancer and acne.	4
4.	The Skeletal System Functions of the Skeletal System. Microscopic Structure of Bone. Axial Skeleton and Appendicular Skeleton. Fractures and Repair of Bone. Joints. Arthritis, joint replacement and osteoporosis.	5

5. The Muscular System 6

Functions of the Muscular System. Types of Muscle Tissue. The Mechanism of Muscle Contraction. Naming of Muscles. Principles of the Actions of Muscle Structure of a Muscle. Major Muscles of the Body. Steroid abuse. Physical fitness and Exercise Physiology. Benefits of Exercise. Precautions Concerning Exercise

6. The Cardiovascular System 11, 12

The Blood: Functions of and composition of the Blood. Blood Cells, Human Blood Types, Transport of Oxygen and Carbon dioxide. Coagulation of Blood. Disorders of the Blood-Anemia, Leukemia, Hemophilia Blood Vessels-Structure of Arteries, Veins, and Capillaries. Pulmonary and Systemic Circulation. Measurement of Blood Pressure and Pulse. The Heart-Structure of the Heart, The Cardiac Cycle and Control of the Heartbeat. Diseases of the Heart and Circulation-Hypertension, Atherosclerosis Coronary Heart Disease, Acute Myocardial Infarction Valvular Heart Disease, Congenital Heart Disease. Risk Factors – Heart Disease and Relation to the Environment

7. Lymphatic System, Immunity and Infectious Disease 12, 13, 13a

Structure and Function of the Lymphatic System and lymphoma. Innate and Acquired Immunity. Antibody-mediated Immunity and Cell-mediated Immunity. Monoclonal antibodies. Transplants and Rejections. Autoimmune Diseases. Infectious Disease Key Terms: Disease, Infectious Disease, Pathogen, Virulence, Infection, Contagious. Louis Pasteur and the Germ Theory of Disease, Koch's Postulates. Disease-causing agents: Viruses, Bacteria, Eukaryotic Pathogens and Parasites Protozoans, Fungi, Worms and Prions. The Signs and Symptoms of Human Disease. The Progression of a Disease. Disease Causing Effects of Pathogens. Disease Transmission-Direct and Indirect contact, Contaminated food or water and Animal vectors. Epidemiology and Current Epidemics. AIDS. Emerging and Reemerging Diseases-optional Biological Warfare and Bioterrorism-optional

8. The Respiratory System 14

Functions of the Respiratory System. The Respiratory Organs; The Nose and Nasal Cavity, Paranasal Sinuses, Pharynx, Larynx, Trachea, Bronchi, Lungs, Thoracic Cavity
The Physiology of Respiration-Breathing, External respiration, Gas transport, internal respiration. Volumes of Air exchanged during Respiration, Lung capacity (optional), Control of Respiration. Respiratory Diseases-Asthma, COPD and lung cancer. The Effect of Smoking and Air Pollution.

9. The Urinary System 16

The Structure and Function of the Urinary System. The Structure of the Kidney-External and Internal Structure; Anatomy Microscopic Anatomy; Structure of the Nephron; Structure of the Excretory Passages. The Physiology of the Urinary System; Constituents of Urine Physical Characteristics of Urine and the Formation of Urine; Filtration Reabsorption, Secretion. Micturition. Peritoneal dialysis, hemodialysis and renal transplantation.

10. The Digestive System 15, 15a

The Nature of Foods: Carbohydrates, Fats, Proteins and Vitamins
The Structure of the Digestive System-Alimentary Canal; Mouth and Associated Structures, Pharynx, Esophagus, Stomach, Small Intestine, Large Intestine. Accessory Glands-Salivary Glands, Liver, Pancreas. The Physiology of the Digestive System- Mechanical and Chemical Digestion in the Mouth; Swallowing; Mechanical and
Chemical Digestion in the Stomach. Digestion in the Small Intestine: Secretions that Enter the Small Intestine; Chemical Digestion and Absorption. Large Intestine-Absorption of Water, Microbial Action and Formation of Digestive Waste
Disorders of the Digestive System including Dental Caries, Heartburn, Acid Reflux Peritonitis, Ulcers, Appendicitis, Cirrhosis, Hepatitis, Gallstones, Pancreatic Cancer and Colitis.
Nutrition and Weight Control-Hunger, Appetite, and Satiation; A Balanced Diet; Energy Content of Foods; Weight Control and Obesity Eating Disorders-Anorexia Nervosa and Bulimia. Food Contamination, Food borne Illnesses and Food Additives. Water-borne diseases and water supply.

11. The Nervous System 7, 8, 8a, 9

Divisions of the Nervous System; Cells of the Nervous System-Neuroglial Cells and

Neurons; The Structure of the Neuron; The Nerve Impulse and Synaptic Transmission. The Brain-Meninges, Cerebrospinal Fluid, Blood-brain Barrier.
Parts of the Brain: Medulla oblongata, Pons, Cerebellum, Thalamus, Cerebrum, Cranial Nerves. The Spinal Cord and Reflexes, Peripheral Nerves, Somatic and Autonomic Nervous System. Disorders of the Nervous System: Alzheimer's disease, Depression, Parkinson's disease, Headaches, Coma and Spinal Cord Injury.

The Sensory Systems

Sensory Receptors. General Sensation: Touch, Pressure, Pain and Temperature receptors.
And Proprioceptors. Special Senses: Olfaction, Taste, Vision, Hearing and Equilibrium

Drugs and Mind (optional)

Caffeine, Nicotine and Alcohol. Hallucinogenic Drugs: Marijuana, LSD, Mescaline and Psilocybin. Misused Prescriptive Drugs: Barbiturates, Amphetamines, Cocaine, Narcotics and Inhalants.

12. The Endocrine System 10

Hormones and endocrine glands- Pituitary, Thyroid, Parathyroid, Pancreas Adrenal Glands, and Pineal glands and Reproductive Endocrine Organs. Prostaglandins. Disorders of the Endocrine System.

The Physiology of Stress (Optional)

The Nature and Physiology of Stress. Stress related illnesses and the Reduction of Stress.

13. Reproduction 17

The Male Reproductive System-Anatomy and Development and the Formation of sperm. The Female Reproductive System-Anatomy and Development Development of the Ovum and Menstruation. The Sexual Act- Sexual Arousal and Coitus. Fertilization. Determination of Sex. Pregnancy and Birth: Conception and early development, Gestation and Labor, Disorders of Pregnancy, Rh incompatibility and Abortion. Contraception: The Rhythm method, Condoms, Vaginal diaphragms, Spermicides, Intrauterine devices, Oral contraceptives and Sterilization. Sexually Transmitted Diseases (STDs): Caused by Bacteria-Chlamydia, Gonorrhea and Syphilis. STDs Caused by Viruses: Genital Herpes, Genital Warts and AIDS.

14. Human Population Growth 24

Introduction: Definition of Population, Population Growth Rate Formula, Immigration and Emigration, and Crude Birth and Death Rates. Population Growth-

Age Structure, Environmental Factors and Population Size: Density-dependent factors. Density-independent factors. Impact of Human Population Growth: Consumption of Limited Resources-Food, Water and Energy. Damage to the Environment: Pollution, Deforestation and Global Warming.

Laboratory Schedule:

LABORATORY COURSE OUTLINE AND CALENDAR				
Week	**Lab Topic**	**Student Learning Objectives-Lab**	**Activity/Case Studies**/Assignments/Exams***	**Lab Exercise #**
1	**Introduction to Human Biology**	**1, 2, 23**	*Laboratory Safety *Scientific Method *Introduction to Anatomy	Intro, 2, Handouts
2	**The Structure and Function of Cells and Human Genetics**	**3, 4, 23**	*Microscope *The Cell-Prokaryotic and Eukaryotic *Comparison of bacterial, animal and plant cells *Osmosis *Mitosis and meiosis *Human Genetics *Case Study	3, 4, 5, 6
3	**Integumentary System**	**5, 23**	*Tissues-epithelial, connective, muscle and nervous. * Skin and derivatives of skin-Structure and function *skin cancer and sunscreen *Case Study	7

4	**Skeletal System**	**6, 23**	Identify bones • Skull, appendicular and axial skeleton Articulate skeleton Case Study	8
5	**Muscular System**	**7, 23**	Identify major muscles Case study	9
6	**Cardiovascular System**	**8, 9, 10, 23**	Blood • Hematocrit • Formed elements of blood • Coagulation Cardiovascular Anatomy and Physiology • Heart anatomy • Sheep heart dissection*** • Circulation • Heart physiology Cardiovascular Assessment • Heart rate and heart sounds • Blood pressure • Electrocardiogram Case Study	10, 11, 12
7	**Lymphatic System, Immunity and Infectious Disease**	**11, 12, 13, 23**	Lymphatic System • Structure and function Immune System Microorganisms in Human Biology • Enviornmental microbiology and Normal Flora Case Study	1, Handouts
8	**Respiratory System**	**14, 23**	Respiratory System • Anatomy • Physiology-vital capacity, spirometry Case Study	11
9	**Urinary System**	**15, 23**	Urinalysis Renal Anatomy and histology Case Study	13
10	**Digestive System**	**16, 23**	Chemical Action of Digestion Anatomy of Digestive System • Rat dissection*** Energy Budget • Calorie and energy expenditure • Basal metabolic rate • Body composition Case Study	14, 15

11	**Nervous System**	**17, 18, 23**	Structure of the Brain, spinal cord and neurons, eye and ear. • Sheep eye dissection*** Nervous System Physiology- sensation, hearing, touch, reflexes and taste Case Study	16, 17
12	**Endocrine System**	**19, 20, 23**	Protein, amine and steroid hormones and targets Case Study	18
13	**Reproductive System**	**21, 23**	Male and Reproductive Anatomy Contraception Case Study	19
14	**Case Studies and Review**		Case Studies/Review	Handouts
15	**Review and Final Laboratory Exam**			

Student Assessment:

Lecture Examinations	_____%
Laboratory Component	_____%
Student Project/Report	_____%
Class Participation	_____%
Other	%
Total	100%

If you have a medical condition or develop a medical condition during this semester, which prevents you from fulfilling the requirements of this course, you must notify your physician. You and your physician must decide whether or not it is appropriate for you to remain in this course. If the decision is to remain in this course, please obtain a letter from your physician indicating that your continued participation in this course is appropriate and present it to the Department Chair.

Faculty Addenda: As per individual faculty member

Lecture Attendance: As per instructor;

Lab Attendance: As per instructor;

Policy Concerning Late Assignments: As per instructor;

Policy Concerning Make-Up Testing: As per instructor;

Safety Information: As per instructor and assigned exercise;

College Policies:

Student Responsibility

Students will be held responsible for reading all pertinent information in college publications regarding withdrawals, course drops, college deadlines, and tuition refunds. Students are responsible for compliance with the rules and regulations as stated in college publications.

Absence of Instructor

Students are expected to wait twenty minutes for a faculty member to come to class. If at the end of twenty minutes, the faculty member does not come, the students should sign an attendance sheet, which indicates the course, date, and time. A student should deliver the attendance sheet to the divisional office (A304) if between 9:00 a.m. and 5:00 p.m. or to the Evening Office (C107) if before 9:00 a.m. or after 5:00 p.m. Students cannot be penalized by faculty for not waiting longer than twenty minutes.

Academic Dishonesty and Plagiarism

Bergen Community College is committed to academic integrity – the honest, fair and continuing pursuit of knowledge, free from fraud or deception. Students are responsible for their own work. Faculty and academic support services staff will take appropriate measures to discourage academic dishonesty. **Plagiarism** is a form of academic dishonesty and may be a violation of U.S. Copyright laws. Plagiarism is defined as the act of taking someone else's words, opinions, or ideas and claiming them as one's own.

Consequences of Violations Academic Integrity

A. Instructor's Sanctions for a Violation

The faculty member will determine the course of action to be followed. This may include:

- Assigning a failing grade on the assignment;
- Assigning a lower final course grade;
- Failing the student in the course
- Other penalties appropriate to the violation;

In all cases, the instructor shall notify the Vice President of Student Services of the violation and the penalty imposed. The student has the right to appeal the decision of the instructor to the appropriate department head.

B. Institutional Sanctions for Violations

When a violation of academic integrity has been reported regarding a student, the Vice President of Student Services may impose disciplinary penalties beyond those imposed by the course instructor, which may include suspension or dismissal from the College. The student shall have the right to a hearing before the Vice President of Student Services or a designated judicial affairs committee. Judicial procedures governing violations of academic integrity are contained in the student handbook.

Class Attendance

All students are expected to attend punctually every scheduled meeting of each course in which they are registered. Attendance and lateness policies and sanctions are to be determined by the instructor for each section of each course. These will be established in writing on the individual course outline. Attendance will be kept by the instructor for administrative and counseling purposes.

Eating and Drinking

Eating or drinking in classrooms, lecture rooms, laboratories, gymnasium, swimming pool, or passageways is forbidden. Covered beverages only are permitted in the library. Eating and drinking are permitted in cafeteria and vending areas only.

Learning Assistance

Henry and Edith Cerullo Learning Assistance Center

The Tutoring Center, English Language Resource Center, Math Walk-In Center and Writing Center are collectively known as the Henry and Edith Cerullo Learning Assistance Center. The Cerullo Learning Assistance Center is located in the Pitkin Education Building, in Room L-125. The telephone number is (201) 447-7489. The Learning Assistance Center, staffed with peer and professional tutors, offers free individual and group tutoring, supplemental instruction, and online tutoring for subjects offered at the College. The Center provides alternative approaches to problem solving and organizational skills. Tutors help clarify classroom lectures and textbooks and help students

prepare for exams. These services build student self- confidence and reduce fear of failure. The Center is equipped with the latest technology and software, including tapes, books, review sheets, exercises and software.

Services for Students with Disabilities

Bergen Community College aims to create inclusive learning environments where all students have maximum opportunities for success. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Specialized Services at 201-612-5269 or via email at ossinfo@bergen.edu for assistance.

Sidney Silverman Library

Main Building, Pitkin Education Center, L-wing, 2nd Floor.
Paramus Library Hours: (201) 447-7131 or visit http://www.bergen.edu/library/calendar/gcal.htm
Paramus Service Desk: (201) 447-7970
Meadowlands Location: 1280 Wall Street, Lyndhurst 2nd Floor
Meadowlands Library Hours: http://www.bergen.edu/library/calendar/gcal.htm
Meadowlands Service Desk: (201) 301-9692
www.bergen.edu/library

Testing Services

The Bergen Community College Office of Testing Services (OTS) is located in Room S-127. OTS serves the college community by identifying, developing, procuring, administering, processing, and/or evaluating examinations, which meet a variety of administrative and instructional needs. To contact the OTS, please call (201) 447-7203. The Office of Testing Services administers makeup tests as a service for students who, for compelling and exceptional reasons, have missed a scheduled classroom examination. Students must receive prior permission from and make arrangements with their course instructors to take these examinations, under specific conditions, in the Office of Testing Services, Room S-127.

WebAdvisor

WebAdvisor is a web interface that allows students to access information contained in Datatel's Colleague, the administrative database used by Bergen Community College. Students may use WebAdvisor to register for classes, to pay tuition and fees, to view their class schedules, to check grades, to check on progress toward degree requirements, etc. WebAdvisor accounts are available for all students enrolled in credit programs. New students are strongly encouraged to attend an in-person registration or advisement session before using a WebAdvisor account. Eligible students without WebAdvisor user names and passwords may access their WebAdvisor account by going to *go.bergen.edu* and selecting "I'm new to WebAdvisor." Then, follow the on-screen directions. Check the WebAdvisor FAQ for answers to common questions, such as how to reset your password. Students must have a valid e-mail address on file with the College to use WebAdvisor