

**Tompkins Cortland Community College**  
**Master Course Syllabus**

**Course Discipline and Number: BIOL 201**  
**Course Title: Human Anatomy and Physiology I**

**Year: 2024-2025**

**Credit Hours: 4**

**Attendance Policy:** *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

**Services for Students with Disabilities:** *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

### **Course Description**

The first course of a two-semester introductory level sequence in human anatomy and physiology intended for students pursuing a career in fields such as medicine, chiropractic, physical therapy, physical education, or recreation. Topics considered are body plan and organization, biochemical organization and function of cells, metabolism, homeostasis, tissues, skeletal and muscular systems, and the nervous system. Dissection of the cat supplements the laboratory materials. Substantial outside preparation for lectures and laboratories is required. BIOL 201 fulfills the SUNY General Education Natural Sciences requirement. Prerequisites: BIOL 104, or BIOL 101 and 102; MATH 095 or MATH 098 and RDNG 116 if required by placement testing; prior completion or concurrent enrollment in ENGL 100 if required by placement testing. 4 Cr. (3 Lec., 3 Lab.) Fall semester.

### **Course Context/Audience**

This course will prepare the student to take additional course work in fields requiring a full year of human anatomy and physiology. It is an appropriate transfer course for students who are considering careers in biology, physical education, physical therapy, chiropractic, and medicine (the student should check with his/her intended transfer institution about specific transfer equivalency).

### **Basic Skills/Entry Level Expectations**

<b>Writing:</b>	WC	College level writing skills are required. See course co-requisites or pre-requisites.
<b>Math:</b>	M3	MATH 095 or MATH 098 if required by placement testing.
<b>Reading:</b>	R4	Before taking this course, students must satisfactorily complete RDNG 116 or have assessment indicating that no reading course was required.

### **Course Goals**

This course is the first of a two semester sequence in which human anatomy and physiology are studied using a body systems approach, with emphasis on the interrelationships between form and function at the gross and microscopic levels of organization. The student will learn about the basic anatomical and directional terminology, fundamental concepts and principles of cell biology, histology, the integumentary, skeletal, muscular and nervous systems (including the special senses).

**Course Objectives/Topics**

Objective/Topic	# Hours
Body Plan and Organization - Students who have completed this section of the course should understand the scope of studies in anatomy and physiology, and be able to use and understand correct and appropriate anatomical and directional terminology and descriptions. This topic sets the basis for all further discussion of anatomy. This section of the course covers: anatomical position, body planes and sections, body regions, body cavities, directional terms, basic terminology, levels of organization, survey of body systems.	4 Hours
Homeostasis - Students who have completed this section of the course should be able to explain the basic concept of homeostasis and how homeostatic mechanisms apply to body systems. This is an important unifying theme, and detailed aspects of homeostatic control will be emphasized throughout both semesters of this course sequence. This section of the course covers: negative and positive feedback, homeostatic mechanisms, control systems. In addition, an introduction to the fluid and electrolyte balance of the body serves as a good overall example of these mechanisms.	2 Hours
Chemical Basis for Life and Cell Biology - This section is a review of materials covered in pre-requisite course work. Students who complete this section should be able to understand that life is based on reactions occurring at the chemical level of organization, and identify cellular structures, and explain their functions in maintaining the activities of the organism as a whole. (The intent of the pre-requisites for the course is to minimize the amount of time spent on this section.) This section of the course covers: atoms and molecules, chemical bonding, inorganic compounds and solutions (including the concept of pH), organic compounds, the concept of concentrations of solutions (molarity/osmolarity), energy transfer using ATP, intracellular organization of nucleus and cytoplasm, membrane structure and function, mechanisms for movement of materials across cellular membranes, organelles, protein synthesis, basics of cellular respiration, somatic cell division (mitosis and cytokinesis).	6 Hours
Histology - Students who complete this section of the course should be able to describe and locate the basic tissues of the body and explain their functions. This section of the course covers: microscopic anatomy, embryological origin, and location and functional roles of all the basic tissue types (epithelial, connective, muscle and nervous), membranes (synovial, mucous, and serous).	6 Hours
Integumentary System - Students who have completed this section of the course should be able to identify and describe the major gross and microscopic anatomical components of the integumentary system, and describe the functions of the system. This section of the course covers: general functions of the skin, gross and microscopic anatomy of the skin and accessory structures, roles of the specific layers of the skin, roles of the accessory structures.	4 Hours
Skeletal System - Students who have completed this section of the course should be able to identify and describe the major gross and microscopic anatomical components of the skeletal system and explain their functional roles in osteogenesis, repair, and body movement. This section of the course covers: general functions of bone and the skeletal system, histology and structure of a typical bone, introduction to the physiology of bone formation, growth, remodeling and repair, names and landmarks of bones, organization of the skeleton, structure and function of joints, classification of joints, range of motion and angular body movements.	15 Hours
Muscular System - Students who have completed this section of the course should be able to identify and describe the major gross and microscopic anatomical components of the muscular system, and explain their functional roles in body movement, maintenance of posture, and heat production. This section of the course covers: general functions of muscle tissue, identification, general location, and comparative characteristics of the three types of muscle tissue, detailed gross and microscopic anatomy of skeletal muscle, physiology of skeletal muscle contraction, skeletal muscle metabolism, nomenclature, location and function of major skeletal muscles, group actions of skeletal muscles (prime movers, synergists, etc.), location and function of the major skeletal muscles.	15 Hours
Nervous System - Students who have completed this section of the course should be able to identify and describe the major gross and microscopic anatomical components of the nervous system and explain their functional roles in communication, control, and integration for the organism as a whole. Since the nervous system is especially important to integration, detailed aspects of its function will be reiterated at various times throughout both semesters of this course sequence. This section of the course covers: general functions of the nervous system, organization from both the functional and structural perspectives, gross and microscopic anatomy of nervous tissue, neurophysiology (including the mechanism of resting membrane potential, production of action potentials, and impulse transmission), neurotransmitters and	24 Hours

their roles in synaptic transmission, sensory receptors and their roles, structure and function of the parts of the brain, protective roles of the cranial bones, meninges, and CSF, structure and function of cranial nerves, anatomy of the spinal cord and spinal nerves, cranial and spinal reflexes and their roles in maintaining homeostasis, introduction to motor and sensory pathways, functions and divisions of the autonomic nervous system, comparison of somatic/autonomic nervous systems.	
Special Senses - Students who have completed this section of the course should be able to identify and describe the major gross and microscopic anatomy of the eye and ear and explain their functional roles in vision, hearing and equilibrium. Students should also be able to identify and locate the receptors responsible for olfaction and gustation and briefly describe the physiology of smell and taste. This section of the course covers: introduction to the gross and microscopic anatomy of the eye and ear, roles of specific tissues of the eye and ear in vision and hearing and equilibrium, olfactory and gustatory receptors and their integrated roles in smell and taste.	6 Hours

### General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<p>Students will be able to</p> <ul style="list-style-type: none"> <li>➤ develop meaningful questions to address problems or issues.</li> <li>➤ gather, interpret, and evaluate relevant sources of information.</li> <li>➤ reach informed conclusions and solutions.</li> <li>➤ consider analytically the viewpoints of self and others.</li> </ul>	<p>This lab science course relies heavily on the scientific method to observe, propose a question, and formulate a testable hypothesis. It requires students to develop testable hypotheses on basic lab or inquiry-based projects.</p> <p>Aside from lecture, students must read and comprehend complex concepts that encompass all body systems on micro- and macro-levels. Exam questions should focus on application and evaluation type thinking skills (<b>not</b> rote memorization) of content. Group work should encompass problems sets with alternative answers</p> <p>Students must apply textbook knowledge toward solving complex questions or address current issues relative to body/organ systems based on the scientific method &amp;/or principles of scientific inquiry. Have students work in groups to solve complex problem sets on lecture content relative to every day aspects of health, science, and technology.</p> <p>Students work in groups during lab and must explain, implement and interpret a course of action to complete the activity. Encourage students to offer and accept critique of each other's interpretation of directions and results. Use peer evaluations for group work to provide feedback on a student's ability to interact within a group.</p>

SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<ul style="list-style-type: none"> <li>➤ Students will begin to understand how their lives are shaped by the complex world in which they live.</li> <li>➤ Students will understand that their actions have social, economic and environmental consequences.</li> </ul>	<p>From a scientific perspective the complex interactions among energy and chemical cycles, and living systems are covered, including the role scientific discovery plays in helping the layperson understand the complex world on a macro-level, and individual health on a micro-level. In context of each chapter, expand on the emergent properties of biological systems and human organ systems, beginning with basic chemistry and continuing with cellular biology, histology through organ systems of the human body.</p> <p>Students learn how scientific discovery has changed man's outlook on life and lead to both societal and health changes which impact society, sociology, psychology, religion and philosophy. Discuss current societal and health issues in light of scientific concepts and advances that the layperson does not fully comprehend. Bring to light that disagreement among the scientific and health communities is the norm before data is accepted as fact.</p> <p>Science and technology are engines that drive economic development. The career choices they make will have an impact on their community. Discuss existing and emerging health-related professions that revolve around each new scientific discovery, including information on how these changes contribute to increased standards of living &amp;/or quality of life/health.</p>

### Instructional Methods

This course should be taught using an integrated lecture/lab format. The laboratory component is essential to the students' experience, as it gives opportunities for "hands-on" work, and should encourage critical thinking, the understanding of scientific methodology, and the application of scientific principles. Direct student participation is preferable to instructor demonstration. Laboratory experiences should include exercises that demonstrate both anatomical and physiological concepts. A dissection of the cat, along with other animal organs as appropriate (such as brains, kidneys, hearts, etc.) is a valuable learning experience not achievable by other means; models, computer simulations and other audiovisual materials should also be available to supplement the dissections. **NOTE: As the opportunity presents a visit to a gross anatomy lab is scheduled in which students inspect dissected human cadavers**

### Methods of Assessment/Evaluation

Method	% Course Grade
Exams on materials presented in both lecture and lab	80%
Quizzes on material presented in lecture and/or lab	20%

### Text(s)

Fundamentals of Anatomy and Physiology, Martini, Frederic, 7th Edition, © 2005 Benjamin Cummings.

Any 2 semester text and lab manual is appropriate; any text published within the last 5 years is probably acceptable.

Previously, TC3 faculty have used texts by Spence & Mason, Marieb, Tortora, & Martini. The Marieb lab manual has been the standard. Human Anatomy and Physiology, Marieb, Elaine, 7th Edition, © 2006 Benjamin Cummings.

Any 2 semester text and lab manual is appropriate; any text published within the last 5 years is probably acceptable.

Previously, TC3 faculty have used texts by Spence & Mason, Marieb, Tortora, & Martini. The Marieb lab manual has been the standard.

### Bibliography

Not available at this time

Revised 02/17

## Other Learning Resources

### Audiovisual

Various films and videos - especially "The Work of the Heart" and "The Work of the Kidneys"

Check the database and ask the personnel at the AV desk for information on what is available, both in-house and through BOCES.

### Electronic

The text has numerous links to internet resources.

### Other

The college owns (and will loan to faculty and students with a valid ID) several sets of a complementary CD rom - "ADAM Interactive Physiology" - these CD's are very helpful in reviewing basic anatomy of systems, and provide animations of some of the more difficult concepts. These CD's can be brought into the class on the "roving computers" available from the AV desk to supplement the lecture/lab.