



# TECHNICAL COLLEGE OF THE LOWCOUNTRY

Technical College of the Lowcountry  
921 Ribaut Road  
Beaufort, SC 29901

Arts & Sciences Division  
Building 9, Room 102  
843-525-8281

## BIO 211

### Anatomy and Physiology II

#### Course Description

This is a continuation of a sequence of courses, including intensive coverage of the body as an integrated whole. All body systems are studied.

Prerequisite: BIO 210.

4.0 Cr 3.0 lect/pres, 3.0 lab, 0 other)

#### Course Focus

The student will gain insight into the function of the human body based on knowledge of the body's structure, both microscopic and macroscopic. The student will be able to demonstrate knowledge of the structural components and physiological processes of the cardiovascular, lymphatic, respiratory, digestive, urinary, endocrine, and reproductive system as well as an understanding of the levels of organization of the human body.

#### Text and References

Required:

##### **Online, In-Class, Whale Branch High School**

OpenStax College, Anatomy & Physiology. OpenStax College, 22 November 2018. This is a free text available at the following link: <https://openstax.org/details/books/anatomy-and-physiology>

Optional:

A hard bound color copy of the book will be available in the TCL Bookstore for purchase. ISBN: 978-193816-813-0.

Carolina Distance Learning<sup>®</sup> Lab Kit is required. Vouchers can be purchased from the TCL Bookstore and redeemed through the Carolina Distance Learning<sup>®</sup> website. All materials needed for the lab are provided in the lab kit.

Scantron forms are available at the TCL bookstore

Recommended:

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Rust, Thomas. A Guide to Anatomy and Physiology Lab, 2nd Edition. Southwest Education Enterprises, 1986. ISBN: 0-937-02900-9

Optional:

Jones, Shirley. Pocket Anatomy & Physiology, 2<sup>nd</sup> Edition. F.A. Davis Company, 2013. ISBN: 978-0803632813

### Core Curriculum Competencies

All course approved for the general education core curriculum help students develop communication skills and/or critical thinking. Students will demonstrate achievements by assessments on the departmental final exam and on testing developed by individual instructors.

This course develops critical thinking skills through instruction that emphasizes the understanding of the scientific disciplines of human anatomy and physiology, as demonstrated in the following:

- A formal essay consisting of multiple paragraphs unified by a single thesis and drawing upon relevant supporting ideas to derive a defensible position on the topic.

### Course Goals

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives. (\*designates a CRUCIAL goal)

1. Understand homeostasis.
2. Use statistical and graphical models to express patterns and relationships in data sets.
3. Apply critical and integrated thinking skills
4. Solve for unknowns by manipulating variables
5. Differentiate the differences between endocrine and exocrine glands.
6. Analyze endocrine structure and function
7. Use written and oral communication skills to explain scientific Concepts
8. Analyze factors that can affect cellular activities
9. Demonstrate correct care and safe use of instruments, equipment, and living organisms
10. Compare and contrast bond types.
11. Identify classes of hormones.
12. Understand structure and function of the endocrine system in relation to growth and homeostasis.
13. Name hypothalamus- pituitary complex hormones
14. Scrutinize hormones of the gonads and their origins and functions.
15. Explain functions of gonadotropins, FSH and LH. \*
16. Scrutinize how estradiol and progesterone affect menstruation.
17. Discuss how the adrenal gland responds to stress. \*
18. Assess hormonal events that initiate lactation.
19. Identify specific technology important in the areas of anatomy and physiology
20. Discuss the path of blood flow through the circulatory system
21. Explain ABO blood types and their importance in blood transfusion. \*
22. Understand the blood clotting process.
23. Detect major arteries entering and leaving the heart.
24. Name the structures of the heart
25. Recall physiology of heart and blood vessels.
26. List some important genetic diseases
27. Review the cardiac cycle as it relates to the electrical conducting system.

28. Listen to heart sounds. \*
29. Interpret resting and abnormal EKG. \*
30. Verify that cardiovascular disease is a major cause of death.
31. Examine venous pumps and varicose veins.
32. Understand how heart valves ensure one-way blood flow during systole and diastole. \*
33. Locate major arteries branching off the aorta and regions of the body they supply blood to. \*
34. Identify the major veins draining into the superior and inferior vena cavae.
35. Know that blood pressure is maintained by the levels of angiotensin and aldosterone. \*
36. Analyze vasoconstriction and vasodilatation
37. Discuss the major anatomical structures and functions of the lymphatic system including vessels. \*
38. Understand how the lymphatic system protects against pathogens \*
39. Define and discuss antigens, antibodies and complement.
40. Recognize pathogen types and outline how the body protects itself. \*
41. Investigate why development of self-tolerance is important.
42. Describe cellular and non-cellular immunity.
43. Summarize development and maturation of b- and t- lymphocytes. \*
44. Distinguish non-specific, innate or natural immunity from specific or acquired immunity.
45. Appreciate respiratory system anatomy
46. Characterize the neuronal network that controls respiration.
47. Appreciate that breathing supplies oxygen, which is critical for oxidative phosphorylation.
48. Access how high arterial carbon dioxide concentrations affect ventilation.
49. Delineate the role of muscles and lung elasticity in inhalation and exhalation.
50. Contrast inspiration and exhalation.
51. Demonstrate spirometer use and examine spirogram data
52. Access kidney function. \*
53. Define partial pressure.
54. Address how erythropoietin regulates red blood cell production.
55. Research edema. 8
56. Examine differences in metabolic and respiratory acidosis and alkalosis.
57. Justify the role of lacteals in transporting products of digestion
58. Relate structure and function of the endocrine system to digestion. \*
59. Appreciate the microscopic anatomy of the liver.
60. Describe enzymatic and bicarbonate content of pancreatic juices. \*
61. State the chemical forms in which the major food classes are absorbed.
62. Describe renal system anatomy
63. Identify the kidney's internal structure. \*
64. Access how oxygen and carbon dioxide are transported
65. State the importance of juxtaglomerular cells in secretion of renin.
66. Know that glucose, sodium, and filtered water is reabsorbed in the renal tubules.
67. Contrast volume and electrolyte content in inter- and extracellular fluid compartments.
68. Recognize how chemical buffers interact to protect the body against lethal changes of pH \*
69. Assess how water excess and dehydration affect kidney function \*
70. Recognize how the lungs and kidneys interact to protect the body against lethal changes of pH
71. Explore how spermatozoa move through the female reproductive tract.
72. Evaluate fertilization.
73. Compare and contrast oogenesis and spermatogenesis.

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74. Distinguish between diploid germ cells and haploid sex cells.
75. Explain what happens during follicular, ovulatory, and luteal phases of the menstrual cycle.
76. Differentiate between zygote, morula, and blastocyst.
77. Gain individual responsibility that serves the values and needs of the community.
78. Recognize that a blastocyst secretes human gonadotropins, which prolongs the life of the corpus luteum. \*

#### Course Evaluation

- Student progress will be evaluated through a series of tests, quizzes in-class and out of class assignments and will be detailed in the attachment to this syllabus.
- Blackboard: lecture notes, handouts, podcasts, study hints, tutor information, syllabi, and other course information is available on the course blackboard page.
- Laboratory Component: This course has a required lab component which supplements the information presented in lecture. The lab will be independently evaluated primarily through lab practicals, in class and out of class lab assignments (such as research papers). For specific details about lab evaluations, please refer to the attachment to this syllabus.

#### TCL GRADING SCALE:

90-100	=	A
80-89	=	B
70-79	=	C
60-69	=	D
Below 60	=	F

#### Student Contributions:

Classes are designed to employ a variety of teaching techniques. In order to maximize learning, required readings should be done prior to a unit. If a student is falling behind in lab performance or academic achievement, it is imperative to seek immediate assistance from the instructors.

A signed copy of TCL's STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL) is on file in the Division Office and in the Learning Resources Center.

#### Course Schedule

The class meets for 2.5 lecture/presentation hours and 3 lab hours per week.

#### STATEMENT OF NON-DISCRIMINATION

The Technical College of the Lowcountry is committed to a policy of equal opportunity for all qualified applicants for admissions or employment without regard to race, gender, national origin, age, religion, marital status, veteran status, disability, or political affiliation or belief.

#### ADA STATEMENT

The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8219 or (843) 525-8242 during the first ten business days of the academic term.

#### ACADEMIC MISCONDUCT

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There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship. It is the student's responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the *TCL Student Handbook*, the Division Office, and the Learning Resources Center.

## ATTENDANCE

The College's statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
  - Students taking an online/internet class must sign in **and** complete an assignment designated by the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
  - Reinstatement requires the signature of the division dean.
  - In the event it becomes necessary for a student to withdraw from the course **OR if a student stops attending class, it is the student's responsibility to contact the instructor via e-mail requesting to be withdrawn from the class.** Withdrawing from class may have consequences associated with financial aid and time to completion. Students are strongly encouraged to consult with Financial Aid prior to withdrawing from any class, particularly if the student is currently on a warning or probation status.
  - When a student exceeds the allowed absences, the student is in violation of the attendance policy. The instructor **MUST** withdraw the student with a grade of "W", "WP", or "WF" depending on the date the student exceeded the allowed absences and the student's progress up to the last date of attendance
- or*
- Under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.
  - Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.
  - A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.
  - A copy of TCL's **STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL)** is on file in the Division Office and in the Learning Resources Center.

## ONLINE ATTENDANCE PROCEDURE

For all online courses, students must complete an assignment designated by the instructor during the first week of classes. The instructor will drop the student from the course if the initial assignment is not completed.

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Instructors will withdraw students from the class when 90% attendance is not maintained. Attendance in an online course is defined by regular course access and by timely completion of assignments as required by the instructor. Each student will be expected to access the web class at least once a week and complete 90% of assignments on time. Additional access is encouraged and may be necessary for successful completion of classes.

Failure to log in and complete assignments will result in the student being withdrawn from the course. The instructor will assign a grade of "W," "WP," or "WF" based upon the student's academic standing as the last date of attendance, which is the last login. Students are responsible for any financial matters associated with an administrative withdrawal. If a student fails to email the instructor (using the my.tcl.edu email account) requesting to be dropped from the course and has not submitted the initial assignment required during the first week of class, the instructor will assign a "Never Attended" code in the student information system (web-advisor) no later than ten calendar days after the first day of the class. Students who are dropped as a result of never attending the course are still responsible for all fees associated with the course.

### **HAZARDOUS WEATHER**

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVW 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVA 101.1, WSOK 1230 AM, WAEV 97.3, WTOG TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp).

### **EMERGENCY TEXT MESSAGE ALERT**

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancellations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to [www.tcl.edu](http://www.tcl.edu). On the homepage, click on "emergency TextAlert at TCL" and fill out the form or go to [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp).

### **GRADING METHODOLOGY**

The final grade must be 70 or more (a grade "C" or better) in order to pass the course and progress to the next course. Students absent from an examination or presentation will receive a "0" grade for the examination unless other arrangements are made with the individual instructor prior to the examination or presentation day or on the examination or presentation day before the test/presentation is scheduled to be given.

The student is responsible for notifying the instructor for the reason of the absence. It is also the responsibility of the student to contact the appropriate instructor to arrange to make up the examination. Arrangements may be completed by telephone.

If the instructor is not available, a message should be left on the instructor's voice mail AND with another member of the faculty or administrative assistant. The make-up exam will be scheduled and the instructor will decide the method of examination. Messages sent by other students are unacceptable.

## **SAFETY ADDENDUM**

### **Purpose**

The purpose of this safety addendum is to provide each student with safety guidelines during an incident, emergency, or disaster at TCL. In addition, it provides students guidelines for lockdown procedures, evacuation procedures, and active shooter.

### **Definitions**

**An incident** is any event, potential or actual, that may impact normal operations but has no immediate health or life threatening consideration or serious effect on the overall functional capacity of the College. An event of this nature should be reported to the Office of the Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

**An emergency** is any incident, potential or actual, which may endanger life or health or which affects an entire building or buildings, and will disrupt the overall operations of the College. Outside emergency services will probably be required, as well as major efforts from campus support services. Major policy considerations and decisions will usually be required from the college administration during times of crises. An emergency should be reported immediately by directly using **911** if life or health/injury considerations exist and then to the Office of the President or Vice President for Administrative Services as quickly as possible. Also notify the off-site campus administrator if applicable.

**A disaster** is any event or occurrence that has taken place and has seriously impaired or halted the operations of the College. In some cases, mass personnel casualties and severe property damage may be sustained. A coordinated effort of all campus-wide resources is required to effectively control the situation. Outside emergency services will be essential. In all cases of disaster, an Emergency Control Center will be activated, and the appropriate support and operational plans will be executed. The disaster should be immediately reported, first by calling **911** and then to the Office of the President or Vice President for Administrative Services. Also notify the off-site campus administrator if applicable.

### **Types of Emergencies**

- Hurricane
- Tornado
- Fire
- Biochemical or Radiation Spill
- Explosion/Bomb
- Downed Aircraft (crash which directly impacts campus operations)
- Utility Failures
- Violent or criminal behavior
- Psychological Crisis

### **Procedures:**

#### **Active Shooter**

Run/hide/fight (<http://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video>)

#### **Building Evacuation**

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1. Building evacuations occur when an alarm sounds and/or upon notification by Security or the Emergency Director.
2. When the building evacuation alarm is activated during an emergency, individuals should exit according to the building evacuation plan and alert others to do the same.
3. Once outside, individuals should proceed to a clear area that is at least 500 feet away from the affected building. Streets, fire lanes, hydrant areas and walkways should be kept clear for emergency vehicles and personnel.
4. Individuals should not return to an evacuated building unless told to do so by Security or the Emergency Director.
5. Individuals should assist persons with disabilities in exiting the building. Elevators are reserved for disabled persons

### **Campus Evacuation**

1. A uniformed Security Guard, the Emergency Director, or an Emergency Resource Team member will announce evacuation of all or part of the campus grounds.
2. All persons (students and staff) are to immediately vacate the campus, or in the case of a partial evacuation relocate to another part of the campus grounds as directed.

### **Lockdown**

1. Clear the halls
2. Report to the nearest classroom/office
3. Assist those needing special assistance
4. Ensure classroom/office doors are closed and locked
5. Turn off lights
6. Stay away from doors and windows (out of the line of sight)
7. BE QUIET and follow instructor's directions
8. Silence cell phones
9. Wait for the "All Clear" before leaving