Cuyahoga Community College Official Statement on Academic Quality:
Cuyahoga Community College is committed to academic quality characterized by an educational climate that is rigorous and disciplined, has high expectations, requires hard work, expects personal and professional integrity, recognizes the dignity and worth of all persons, and provides support for teaching, learning and scholarship.

BIOLOGY 2341 ANATOMY AND PHYSIOLOGY II
Lecture (82085): 9:30 until 10:45 am on T & Th in EHCT 21 (3 lecture hours; 3 credit hours)
Laboratory (82084): 11:00 am until 12:15 pm on T & Th in EHCT 233 (3 lab hours; 1 credit hour)

TERM Full Term Fall Semester 2018

INSTRUCTOR Lou Rifici
Assistant Professor of Biology/Environmental, Health and Safety Technology
On Campus: Office: EHCT 211H, (216) 987-2097, voice mail available
E-mail: louis.rifici@tric.edu
My Personal Web Site: http://cccprofessorlou.com

Office Hours: M & W: 2:00-5:00 pm; T & Th: 1:00-3:00 pm Or by appointment

BIO 2341 CATALOG DESCRIPTION: "Study of structure and function of human body. Considers structure, function, and terminology of cardiovascular, lymphatic, respiratory, urinary systems, digestive and reproductive system. Immunology, cellular division, embryological and fetal development, classical genetics and genetic technology considered. Laboratory experiences include demonstrations, microscopic observations, anatomic models, and videos related to topics."

Course Outcomes and Objectives are found at the end of this syllabus.

PREREQUISITE BIO 2331 Anatomy and Physiology I

NEEDED BOOKS AND MATERIALS
4. Colored pencils are recommended for lab.
5. Regular access to a computer with reliable, efficient Internet connection.

ACADEMIC CREDIT Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required.
since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course. The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

DETERMINING YOUR FINAL GRADE

Reading Assignments:
- Read the assigned textbook and laboratory pages in PREPARATION FOR CLASS. This is a standing homework assignment and is the key to getting the highest grade.
- Determine your reading assignments, lecture topics, and lab topics using the Schedules on the last two pages of this syllabus.
- All lecture readings are in Human Anatomy and Physiology, 10th ed. by Marieb and Hoehn unless noted otherwise.

Lecture Tests:
- Four tests. Final test is not cumulative.
- Tests will consist of a variety of question types including multiple choice, matching, diagram interpretation, and written answer. See the EXAMPLE lecture tests located at the class web page: http://www.cccprofessorlou.com/bio-2341.php.
- Questions requiring a written response will include those testing your knowledge and understanding of course outcomes and objectives listed in the Course Description above. Such questions may carry a higher point value and require a lengthier response than other written answer questions present on the test.
- Please see my Lecture Test Grading Policy at your course web page.
- The test environment must be quiet and free from distractions. Absolutely no phone use.

Laboratory Tests:
- Four tests. Final Test is not cumulative.
- A typical test is a lab practical – a test that requires you to answer questions at stations located around the laboratory.
- Lab emphasizes the memorization of anatomy and explanation of laboratory observations and lessons. Both will be tested.
- Please see my Lab Test Grading Policy located at your course web page: http://www.cccprofessorlou.com/bio-2341.php.
- The test environment must be quiet and free from distractions. Absolutely no phone use.

Computer-Based Homework in support of Course Outcomes and Objectives:
Homework is completed electronically using the web-based app, Modified Mastering A&P, developed by your textbook publisher, Pearson Education Inc. You will use an access code to register for and login to Mastering A&P. Use of Modified Mastering A&P is REQUIRED for this course.

The Modified Mastering A&P access code comes bundled with your textbooks when you purchase through the Eastern Campus Bookstore. If you get your textbook from somewhere other than the campus bookstore, you may need to purchase the access code separately, either at the bookstore or on-line.
If you purchase *Modified Mastering A&P* separately, you will have the option of purchasing it with or without access to an eText to supplement or even replace the required textbook for this course.

Once you obtain your *Modified Mastering A&P* access code, use the link provided at the COURSE WEB PAGE to navigate to the registration page. Click “Register Now.” To register for the first time, you need an e-mail, the course ID (see below), and your access code (comes with your textbook or purchased separately). If you used *Modified Mastering A&P* to complete your A&P I course (Bio 2331) or in a previous attempt of A&P II, use your userid and password to log-in to the website and sign-in to my site using the Course ID below.

The course ID this semester is: rifici94613

<table>
<thead>
<tr>
<th>GRADING</th>
<th>Number</th>
<th>Point Value</th>
<th>Total Points</th>
<th>% of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Tests</td>
<td>4</td>
<td>150</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>Lab Tests</td>
<td>4</td>
<td>100</td>
<td>400</td>
<td>33</td>
</tr>
<tr>
<td>Computer-Based Homework in support of course outcomes and objectives</td>
<td>10</td>
<td>20</td>
<td>200</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1200</td>
<td><strong>100</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRADING SCALE**  
A = >1079 points (90%), B = 960 to 1079 points (80%), C = 840 to 959 points (70%), D = 720 to 839 points (60%), F = <720 points

**Departmental Policy:** In order to pass BIO-2341, you must earn at least a 60% in both lecture and lab.

**ATTENDANCE AND MAKEUP POLICY** *The College Policy says:*  
“Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in Federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Tri-C is responsible for identifying students who have not attended a course, before financial aid funds can be applied to students’ accounts. Therefore, attendance will be recorded in the following way:

For **in-person courses**, students are required to attend the course by the 15th day of the semester, or equivalent for terms shorter than 5-weeks, to be considered attending. Students who have not met all attendance requirements for an in-person course, as described herein, within the first two weeks of the semester, or equivalent, will be considered not attending and will be reported for non-attendance and dropped from the course.

At the conclusion of the first two weeks of a semester, or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class, wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be
ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with class work because of a prolonged absence should confer with the instructor or a counselor."

My Policy is:

YOU ARE NOT ENTITLED TO MAKE UP MISSED TESTS AND/OR ASSIGNMENTS.
- Completing your tests at the scheduled time and place must be a priority.
- ONLY PERSONAL ILLNESSES OR PERSONAL EMERGENCY are valid reasons for missing tests. There is no make up for computer-based homework.
- According to Princeton’s Wordnet, an emergency is a sudden unforeseen crisis (usually involving danger) that requires immediate action.
- It is your responsibility to alter your personal schedule so you do not miss tests. Computer-based homework may be completed any time before the due date.
- Vacations and non-emergency hospital visits should not interfere with completing tests and assignments.

If you miss a test for a valid reason:
1. Call or write me WITHIN 24 HOURS of the missed test. — THERE ARE NO EXCEPTIONS TO THIS RULE.
   - Give me the reason for your absence
   - Receive instructions about taking the make up test
   - Schedule your make up
2. Take the make up test at the scheduled time and place
   - There is one make up test date, December 11, 2018.

Also note: I will decide the content of each make up test. No other graded assignments (in-class or out of class) or bonus work may be made up. Abuse of the make up policy can lead to it being revoked. Due to the lack of open lab time, laboratory exercises may not be made up.

LEARNING RESOURCE CENTER Tutors for biology classes are available in ESS-1108 (987-2256). Check there or the class website for hours and availability. If you decide to use a tutor, seek one as soon as possible, make regular visits, and come prepared for each visit. I am available to tutor you by appointment.

ACADEMIC MISCONDUCT Any student found to have committed or to have attempted to commit any act of dishonesty, including cheating, plagiarism, or other forms of academic dishonesty, is subject to the disciplinary sanctions outlined in the Student Judicial System.

Refer to the Student Conduct Code 3354:1-30-03.5 and Student Judicial System 3354:1-30-03.6 for more information about violations and College disciplinary procedures. The Student Conduct and Academic Honor code can be accessed via My Tri-C Space on the Student Services tab. The policies are located in the College Guidelines channel located near the bottom of the page.

ESTABLISHING AND MAINTAINING A HEALTHY CLASSROOM ENVIRONMENT All of us must work to establish and maintain a classroom environment that is inviting, inclusive, and supports learning. Please read my specific Rules for the Classroom located at the class webpage: http://www.cccprofessorlou.com/resources/Classroom%20Etiquette%202012.pdf.
WITHDRAWAL POLICY Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in Federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Tri-C is responsible for identifying students who have not attended or logged into a class for which they are registered. At the conclusion of the first two weeks of a semester, instructors may report any registered students who have "Never Attended" a class so that those reported students will be administratively withdrawn from that class. However, it is the student's responsibility to withdraw, using the appropriate Tri-C form, from any class which she/he is no longer attending or risk receiving a failing grade in that class. Student's wishing to withdraw must complete and submit the appropriate Tri-C form by the established withdrawal deadline. The last day to withdraw from this course is November 16, 2018.

INCOMPLETE POLICY Instructors determine grades, subject to the College’s policies and procedures. A notation of “I” indicates that a student has not completed all course requirements because of circumstances judged by the instructor to be beyond the student’s control. Failure to complete such requirements no later than the end of the fifth full week of the next semester will result in an “F” (Failing) grade.

YOUR PRIVACY Federal law and College Policy prohibit me from discussing your current and final grades with anyone but you. Therefore, I am unwilling to give grade information over the phone or via e-mail. Please utilize my office hours to discuss current and final grades with me.

CAMPUS POLICE AND SECURITY SERVICES are dedicated to protecting life and property, while detecting and preventing crime. The department includes police officers, detective bureau, K-9 patrol, security officers, dispatchers, administrative staff, and student patrols.

FOR ASSISTANCE OR TO REPORT A CRIME CALL:  Non-emergencies: 216-987-4325
               Emergencies: 216-987-4911

When on campus always take note of the two nearest exits and emergency signs in all classrooms. If there is an emergency alarm informing all to evacuate or a fire alarm, immediately take your personal belongings with you. Do not reenter the building until notified by emergency personnel. If there is an alarm for seeking shelter due to inclement weather, go to the lowest level and stay away from windows. Follow the directions of the announcements. A “Lock Down” announcement will require all campus members to stay in the building and not to evacuate/leave.

CONCEALED CARRY STATEMENT College policy prohibits the possession of weapons in the classroom by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers). This policy applies to all students, faculty and staff without regard to any concealed handgun license or permit an individual may possess. As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available within the Tri-C student handbook, available athttp://www.tri-c.edu/handbook. You must also comply with the College’s Zero Tolerance for Violence on College Property Policy available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf.

ACCESSIBILITY STATEMENT If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the ACCESS office). Accommodations will not be made retroactively.
RECYCLING ON CAMPUS Please use the recycling bins located on campus to dispose of your cans, bottles, and paper. Do not place trash or non-recyclable materials into the recycling bins. Be a part of this important effort to conserve resources and reduce pollution.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Day</th>
<th>LECTURE Topic</th>
<th>Reading Assignment (Marieb &amp; Hoehn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/28</td>
<td>T</td>
<td>Cardiovascular System: Heart</td>
<td>Chapter 18: 663-692</td>
</tr>
<tr>
<td></td>
<td>8/30</td>
<td>TH</td>
<td>Heart, continued</td>
<td>**</td>
</tr>
<tr>
<td>2</td>
<td>9/4</td>
<td>T</td>
<td>Heart, continued</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>9/6</td>
<td>TH</td>
<td>Heart, continued</td>
<td>**</td>
</tr>
<tr>
<td>3</td>
<td>9/11</td>
<td>T</td>
<td>Cardiovascular System: Blood</td>
<td>17: 635-659</td>
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<tr>
<td></td>
<td>9/13</td>
<td>TH</td>
<td>Blood, continued</td>
<td>**</td>
</tr>
<tr>
<td>4</td>
<td>9/18</td>
<td>T</td>
<td>Cardiovascular System: Vessels</td>
<td>19: 698-729</td>
</tr>
<tr>
<td></td>
<td>9/20</td>
<td>TH</td>
<td>Vessels, continued</td>
<td>**</td>
</tr>
<tr>
<td>5</td>
<td>9/25</td>
<td>T</td>
<td>Vessels, continued</td>
<td>**</td>
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<tr>
<td></td>
<td>9/27</td>
<td>TH</td>
<td>Lymph and Lymph Transport (topic for Test Two)</td>
<td>20: 757-767</td>
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<tr>
<td>6</td>
<td>10/2</td>
<td>T</td>
<td>Lecture Test One (does not include Lymph/Lymph Transport)</td>
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<tr>
<td></td>
<td>10/4</td>
<td>TH</td>
<td>Immune System</td>
<td>21: 771-803</td>
</tr>
<tr>
<td>7</td>
<td>10/9</td>
<td>T</td>
<td>Immunity, continued</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>10/11</td>
<td>TH</td>
<td>Immunity, continued</td>
<td>**</td>
</tr>
<tr>
<td>8</td>
<td>10/16</td>
<td>T</td>
<td>Respiratory System</td>
<td>22: 807-846</td>
</tr>
<tr>
<td></td>
<td>10/18</td>
<td>TH</td>
<td>Respiratory, continued</td>
<td>**</td>
</tr>
<tr>
<td>9</td>
<td>10/23</td>
<td>T</td>
<td>Lecture Test Two</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>10/25</td>
<td>TH</td>
<td>Digestive System</td>
<td>23: 856-906</td>
</tr>
<tr>
<td>10</td>
<td>10/30</td>
<td>T</td>
<td>Digestive, continued</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>11/1</td>
<td>TH</td>
<td>Digestive, continued</td>
<td>**</td>
</tr>
<tr>
<td>11</td>
<td>11/6</td>
<td>T</td>
<td>Digestive, continued</td>
<td>**</td>
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<tr>
<td></td>
<td>11/8</td>
<td>TH</td>
<td>Urinary System</td>
<td>25: 961-991</td>
</tr>
<tr>
<td>12</td>
<td>11/13</td>
<td>T</td>
<td>Urinary, continued</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>11/15</td>
<td>TH</td>
<td>Urinary, continued</td>
<td>**</td>
</tr>
<tr>
<td>13</td>
<td>11/20</td>
<td>T</td>
<td>Lecture Test Three</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>11/22</td>
<td>TH</td>
<td>Thanksgiving</td>
<td>**</td>
</tr>
<tr>
<td>14</td>
<td>11/27</td>
<td>T</td>
<td>Reproductive Systems including Cell Division</td>
<td>27: 1026-1063</td>
</tr>
<tr>
<td></td>
<td>11/29</td>
<td>TH</td>
<td>Reproductive, continued</td>
<td>**</td>
</tr>
<tr>
<td>15</td>
<td>12/4</td>
<td>T</td>
<td>Pregnancy and Human Development</td>
<td>28: 1074-1099</td>
</tr>
<tr>
<td></td>
<td>12/6</td>
<td>TH</td>
<td>Pregnancy and Human Development, continued</td>
<td>**</td>
</tr>
<tr>
<td>Finals</td>
<td>12/11</td>
<td>T</td>
<td>SCHEDULED MAKE UP TESTS – Lab and Lecture – Appointments only, No Walk-Ins – No Class</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>12/13</td>
<td>TH</td>
<td>LECTURE TEST 4 (Note Day and Special Time: Block 2 – 9:15 am-11:15 am)</td>
<td>**</td>
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</table>

** This schedule is tentative and subject to change at the discretion of the faculty member. All changes will be announced.**
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<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Day</th>
<th>LABORATORY Topic</th>
<th>Lab Exercise</th>
<th>Marieb &amp; Hoehn supporting text</th>
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<tbody>
<tr>
<td>1</td>
<td>8/28</td>
<td>T</td>
<td>Heart Anatomy: Models</td>
<td>Exercise 21: 371-383</td>
<td>668-673</td>
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<td></td>
<td>8/30</td>
<td>TH</td>
<td>Heart Anatomy: Dissection</td>
<td>21: 384-383</td>
<td>668-673</td>
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<td></td>
<td>9/6</td>
<td>TH</td>
<td>Blood Typing; complete Counting</td>
<td>20: 366-368</td>
<td>656-659</td>
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<tr>
<td>3</td>
<td>9/11</td>
<td>T</td>
<td>Blood Vessels: Microscopic Anatomy, Pulmonary and Cerebral Circulation</td>
<td>22: 393-402</td>
<td>728-750</td>
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<td></td>
<td>9/13</td>
<td>TH</td>
<td>Blood Vessels: Arteries and Veins</td>
<td>22: 403-412</td>
<td>Ch. 19</td>
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<tr>
<td>4</td>
<td>9/18</td>
<td>T</td>
<td>Lab Test 1</td>
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<td></td>
<td>9/20</td>
<td>TH</td>
<td>Blood Vessels: Arteries and Veins</td>
<td>22: 403-412</td>
<td>Ch. 19</td>
</tr>
<tr>
<td>5</td>
<td>9/25</td>
<td>T</td>
<td>Blood Vessels: Arteries and Veins</td>
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<td>&quot;</td>
</tr>
<tr>
<td></td>
<td>9/27</td>
<td>TH</td>
<td>Blood Vessels: Arteries and Veins</td>
<td>&quot;</td>
<td>&quot;</td>
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<tr>
<td>6</td>
<td>10/2</td>
<td>T</td>
<td>Cardiovascular Physiology: Heart Sounds, HR, and BP</td>
<td>23: 417-423</td>
<td>683-688</td>
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<tr>
<td>7</td>
<td>10/9</td>
<td>T</td>
<td>Cardiovascular Physiology: Effect of Exercise</td>
<td>23: 424-425</td>
<td>688</td>
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<tr>
<td></td>
<td>10/11</td>
<td>TH</td>
<td>Lab Test 2</td>
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<tr>
<td></td>
<td>10/18</td>
<td>TH</td>
<td>Respiratory Physiology</td>
<td>26: 467-482</td>
<td>823-829</td>
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<td>9</td>
<td>10/23</td>
<td>T</td>
<td>Digestive System: Gross Anatomy</td>
<td>27: 485-499</td>
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<tr>
<td></td>
<td>10/25</td>
<td>TH</td>
<td>Digestive System: Gross Anatomy</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>10</td>
<td>10/30</td>
<td>T</td>
<td>Digestive System: Micro Anatomy</td>
<td>27: 500-508</td>
<td>Ch. 23</td>
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<tr>
<td></td>
<td>11/1</td>
<td>TH</td>
<td>Urinary System: Anatomy and Dissection</td>
<td>29: 523-534</td>
<td>962, 964-966, 968, 970, 989</td>
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<tr>
<td>11</td>
<td>11/6</td>
<td>T</td>
<td>Urinary System: Dissection</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td>11/8</td>
<td>TH</td>
<td>Urinary System: Physiology</td>
<td>30: 537-543</td>
<td>Ch. 25</td>
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<tr>
<td>12</td>
<td>11/13</td>
<td>T</td>
<td>Female Reproductive Anatomy</td>
<td>32: 565-578</td>
<td>1045-1046, 1050, 1057</td>
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<td>11/15</td>
<td>TH</td>
<td>Lab Test 3</td>
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<tr>
<td>13</td>
<td>11/20</td>
<td>T</td>
<td>Male Reproductive Anatomy</td>
<td>31: 549-564</td>
<td>1027, 1029, 1031, 1038, 1040</td>
</tr>
<tr>
<td></td>
<td>11/22</td>
<td>TH</td>
<td>Thanksgiving</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Day</td>
<td>LABORATORY Topic</td>
<td>Lab Exercise</td>
<td>Marieb &amp; Hoehn supporting text</td>
</tr>
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<tr>
<td>14</td>
<td>11/27</td>
<td>T</td>
<td>Human Cell Division: Mitosis</td>
<td>3.4: 34-36</td>
<td>96-98; 100-101</td>
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<tr>
<td></td>
<td>11/29</td>
<td>TH</td>
<td>Gametogenesis: Oogenesis and Spermatogenesis</td>
<td>31.4: 556-557, 561 32.4: 572-573</td>
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<td>Human Development</td>
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<td><strong>LAB TEST 4 – all students</strong> SCHEDULED MAKE UP TESTS</td>
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<td>– Lab and Lecture – Appointments only, No Walk-Ins</td>
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CHILDREN, EATING, AND DRINKING ARE STRICTLY PROHIBITED IN THE LAB.

Marieb and Hoehn supporting text = Marieb and Hoehn’s Human Anatomy and Physiology, 10th ed.

** This schedule is tentative and subject to change at the discretion of the faculty member. All changes will be announced.**
OUTCOMES/OBJECTIVES  Upon satisfactory completion of BIO 2341 - Anatomy and Physiology II, the student should be able to perform the following outcomes and supporting objectives:

Outcome A. Describe and differentiate between the gross and microscopic anatomy of the organs, tissues, and cells of the cardiovascular, lymphatic/immune, respiratory, urinary, digestive and reproductive systems and relate anatomical structures to physiological functions.

Supporting Objectives:
1. Describe the cellular characteristics, biological functions, and life cycle of red blood cells, granulocytes (basophils, eosinophils, and neutrophils), agranulocytes (lymphocytes and monocytes), and platelets.
2. Explain the location of the heart and its major blood vessels.
3. Describe the structures of the pericardium, heart wall, and cardiac valves, and relate these structures to the functions of the heart.
4. Describe the external and internal anatomy of the chambers of the heart, including the attached blood vessels and associated valves, and relate these structures to the functions of the heart.
5. Outline the flow of blood through the heart and systemic and pulmonary circulation naming the correct chambers, valves, and vessels in correct order.
6. Describe the location of coronary arteries and veins and name their functions.
7. Relate the structural characteristics of cardiac muscle cells to their functions.
8. Compare and contrast the structure of muscular arteries, elastic arteries, arterioles, veins, venules, and capillaries and relate their structure to their functions.
9. Compare and contrast continuous, fenestrated, and sinusoidal capillaries and relate their structure to their functions.
10. Identify major arteries and veins of the upper limb, lower limb, thorax, abdomen, and brain and describe their functions.
11. Describe the structure of lymphatic capillaries, vessels, trunks, and ducts and relate their structure to their function.
12. Identify lymphatic vessels, trunks, andducts and name their functions.
13. Describe the location, structure, and function of primary immune tissues (red bone marrow and thymus).
14. Describe the location, structure, and function of secondary immune tissues and organs including tonsils, lymph nodes, spleen, Peyers Patches, appendix, and mucosal-associated lymphoid tissue (MALT).
15. Describe the location, structure, and function of the components of the respiratory system, beginning at the nose and ending at the alveoli.
16. Describe the gross and microscopic anatomy of the lungs, including their blood and lymphatic supply.
17. Describe the location, structure, and functions of the components of the gastrointestinal tract, beginning at the mouth and ending at the anus.
18. Describe the histology of the gastrointestinal tract and name a function of each layer.
19. Describe the location, structure, and functions of the accessory organs of the digestive system, including salivary glands, liver, gallbladder, and pancreas.
20. Describe the location, structure, and function of the peritoneum.
21. Describe the location, structure, and functions of the components of the urinary system, beginning at the kidney and ending at the urethra.
22. Explain the location, structure, and functions of each region of a nephron.
23. Explain the blood supply to and from the kidney, including the microscopic structure of the glomerulus.
24. Compare and contrast the location, structures, and functions of the components of the male and female reproductive systems.
25. Discuss the structure and development of mammary glands and the endocrine system's control during lactation.

Outcome B. Apply fundamental knowledge of the cardiovascular system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research, and advanced scientific study.

Supporting Objectives:
1. List the functions of blood.
2. Describe the composition of whole blood.
3. Describe the chemical composition and biological functions of plasma.
4. Describe the cellular characteristics, biological functions, and life cycle of red blood cells, granulocytes (basophils, eosinophils, and neutrophils), agranulocytes (lymphocytes and monocytes), and platelets.
5. Define hematopoiesis, describe the origin and production of the different formed elements, and relate factors that influence formed element production.
6. Define hemostasis and describe the mechanisms of actions for vascular spasm, platelet plug formation, and coagulation.
7. Explain hemostatic control mechanisms that limit coagulation.
8. Explain the basis of the ABO and Rh blood grouping systems, transfusion reactions, and hemolytic disease of the newborn.
9. Describe the functions of the heart.
10. Explain the location of the heart and its major blood vessels.
11. Describe the structures of the pericardium, heart wall, and cardiac valves, and relate these structures to the functions of the heart.
12. Describe the external and internal anatomy of the chambers of the heart, including the attached blood vessels and associated valves, and relate these structures to the functions of the heart.
13. Outline the flow of blood through the heart and systemic and pulmonary circulation naming the correct chambers, valves, and vessels in correct order.
14. Describe the location of coronary arteries and veins and name their functions.
15. Explain the structures and functions of the cardiac conducting pathway.
16. Describe the electrical events that occur during the waves and intervals of a normal electrocardiogram (ECG).
17. Describe the pressure and volume changes that occur during a cardiac cycle.
18. Explain common heart sounds and relate their timing to ECG events and changes in pressure during a cardiac cycle.
19. Relate the electrical and mechanical events of cardiac cycle to heart anatomy.
20. Define cardiac output, stroke volume, and heart rate, and describe extrinsic and intrinsic factors that affect these values.
21. Describe the functions of the circulatory system.
22. Compare and contrast the structure of muscular arteries, elastic arteries, arterioles, veins, venules, and capillaries and relate their structure to their functions.
23. Compare and contrast continuous, fenestrated, and sinusoidal capillaries and relate their structure to their functions.
24. Describe the exchange of materials in capillary beds.
25. Identify major arteries and veins of the upper limb, lower limb, thorax, abdomen, and brain and describe their functions.
26. Describe major circulatory routes through the upper limb, lower limb, thorax, abdomen, and brain.
27. Define blood pressure and describe how it is measured.
28. Define pulse and define systolic, diastolic, and pulse pressure.
29. Define mean arterial pressure and peripheral resistance and explain their relationships to the rate of blood flow, blood vessel diameter, blood viscosity, blood volume, and cardiac output.
30. Explain short- and long-term mechanisms that affect arterial blood pressure, including the cardiovascular center of the medulla oblongata; autonomic nervous system; baroreceptors and chemoreceptors; hormones, and autoregulation.

Outcome C. Apply fundamental knowledge of the lymphatic/immune system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research, and advanced scientific study.

Supporting Objectives:

1. Describe the functions of the lymphatic system.
2. Describe the structure of lymphatic capillaries, vessels, trunks, and ducts and relate their structure to their function.
3. Identify lymphatic vessels, trunks, and ducts and name their functions.
4. Describe the location, structure, and function of primary immune tissues (red bone marrow and thymus).
5. Describe the location, structure, and function of secondary immune tissues and organs including tonsils, lymph nodes, spleen, Peyer’s Patches, appendix, and mucosal-associated lymphoid tissue (MALT).
6. Describe mechanisms of innate immunity including physical barriers, chemical mediators, and cells.
7. Describe the inflammatory response.
8. Describe mechanisms of cell-mediated adaptive immunity, including the cells and molecules necessary.
9. Describe mechanisms of antibody-mediated (humoral) adaptive immunity, including the general structure of antibodies and the functions of the five classes of antibodies.
10. Explain the four ways to acquire adaptive immunity: natural passive, natural active, artificial passive, and artificial active adaptive immunity.

Outcome D. Apply fundamental knowledge of the respiratory system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research, and advanced scientific study.

Supporting Objectives:

1. Describe the functions of the respiratory system.
2. Describe the location, structure, and function of the components of the respiratory system, beginning at the nose and ending at the alveoli.
3. Describe the gross and microscopic anatomy of the lungs, including their blood and lymphatic supply.
4. Discuss the different histological components of the respiratory membrane.
5. Define ventilation, external respiration, and internal respiration and describe events involved in each process.
6. Apply gas laws to inspiration and expiration and movement of gases.
7. Define compliance, minute ventilation, and alveolar ventilation.
8. Distinguish between the different types of pulmonary air volumes and capacities and describe how they are measured.
9. Define partial pressure and explain factors that affect movement of oxygen and carbon dioxide in the body.
10. Describe mechanisms and factors that control ventilation, including the medullary respiratory center, pontine respiratory group, central chemoreceptors, peripheral chemoreceptors, and the Hering-Breuer reflex.

Outcome E. Apply fundamental knowledge of the urinary system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research, and advanced scientific study.

Supporting Objectives:
1. Describe functions of the urinary system.
2. Describe the location, structure, and functions of the components of the urinary system, beginning at the kidney and ending at the urethra.
3. Explain the location, structure, and functions of each region of a nephron.
4. Explain the blood supply to and from the kidney, including the microscopic structure of the glomerulus.
5. Discuss the process of urine formation, including glomerular filtration, tubular reabsorption, and tubular secretion, and relate each step to kidney anatomy.
6. Relate the structure of the kidney to its mechanisms to concentrate urine.
7. Compare how different hormones affect urine concentration and volume.
8. Define plasma clearance, glomerular filtration rate, tubular load, and tubular maximum, and relate these values to kidney function.
9. Explain the micturition reflex.
10. List the physical characteristics and normal chemical composition of urine and compare it to the normal chemical composition of plasma and filtrate.
11. Discuss the general principles of fluid and electrolyte balance, acid base balance, and homeostasis of body fluids.

Outcome F. Apply fundamental knowledge of the digestive system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research, and advanced scientific study.

Supporting Objectives:
1. Describe the functions of the gastrointestinal tract.
2. Describe the location, structure, and functions of the components of the gastrointestinal tract, beginning at the mouth and ending at the anus.
3. Describe the histology of the gastrointestinal tract and name a function of each layer.
4. Describe the location, structure, and functions of the accessory organs of the digestive system, including salivary glands, liver, gallbladder, and pancreas.
5. Describe the location, structure, and function of the peritoneum.
6. Compare and contrast chemical and mechanical digestion.
7. Define a nutrient, describe the functions of the six classes of nutrients, and state the enzyme(s) necessary to digest it, if applicable.
8. Describe the chemical composition and functions of the major secretions of the gastrointestinal tract and accessory organs, including saliva, bile, gastric acid, and pancreatic juices.
9. Define the various movements of the gastrointestinal tract and describe their regulation. Movements include mastication (chewing), swallowing (deglutition), peristalsis, mass movements, segmental contractions, and defecation.
10. Discuss the neurological and hormonal mechanisms that regulate activity of the gastrointestinal tract and its accessory organs.

Outcome G. Apply fundamental knowledge of the reproductive system to explain homeostasis and to predict outcomes of disrupted structure and/or function in order to succeed in preparatory coursework for health professions, biomedical research and advanced scientific study.

Supporting Objectives:
Describe the functions of the male and female reproductive tracts.
1. Compare and contrast the location, structures, and functions of the components of the male and female reproductive systems.
2. Describe the processes of spermatogenesis and oogenesis.
3. Describe the endocrine system’s regulation of the anatomy and physiology of the male reproductive systems, including maturation at puberty, formation of sperm, and sex act.
4. Describe the sex hormones secreted by cells of the male and female reproductive systems, including the source of each hormone, the target cells of each hormone, and their major effects on the body.
5. Describe the events in the ovarian and uterine cycles, including how hormones from the brain control the ovarian cycle and how hormones from the ovaries control the uterine cycle.
6. List the paths of sperm production and release in the male; oocyte production and release in the female; ejaculated sperm in the female; and fertilized oocyte in the female.

7. Discuss the structure and development of mammary glands and the endocrine system's control during lactation.

**Outcome H. Relate the concepts of mitotic and meiotic cell division to cellular repair, gamete formation, and tissue formation.**

**Supporting Objectives:**
1. Describe the processes of spermatogenesis and oogenesis.
2. Discuss the stages, events, and significance of mitosis and meiosis.
3. Describe events that occur during the stages of cell cycle and differentiate between interphase, mitosis, and cytokinesis.

**Outcome I. Describe the stages in the development of the zygote, embryo, and fetus.**

**Supporting Objectives:**
1. Describe major events that occur from fertilization to the blastocyst stage, including the process of implantation.
2. Describe major events in formation of the placenta and three germ layers of the embryo, and describe the fate of each structure.
3. Describe location, structure, functions and fate of the placenta, umbilical cord, and extra-embryonic membranes of early development.
4. Describe major developmental events of fetal and postnatal development and name the time periods during which they occur.

**Outcome J. Describe the events of parturition and the control of lactation.**

**Supporting Objectives:**
1. Discuss the structure and development of mammary glands and the endocrine system's control during lactation.
2. Describe major events that occur during the three stages of parturition.
3. Explain changes in maternal and fetal hormones that occur at birth.
4. Describe respiratory, cardiovascular, and digestive changes that occur in the newborn.
5. Describe the physiological events of lactation and the role of hormones in milk production and release.

**Outcome K. Discuss the principles of classical and contemporary genetics.**

**Supporting Objectives:**
1. Describe the central dogma of biology, the structure of DNA, RNA, and protein molecules, and the transmission of information from DNA to protein.
2. Calculate probabilities of inheritance of dominant/recessive, incomplete dominant, co-dominant, and sex-linked traits and diseases.
3. Create and interpret simple pedigrees illustrating dominant/recessive, incomplete dominant, co-dominant, and sex-linked traits and diseases.
4. Explain basic ideas of biotechnology such as gene "knock-out," genome mapping, gene sequencing, and cloning.
Student Registration Instructions

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