EXSC 340-01-02 Exercise Physiology

Instructor: Michael G. Flynn
Office: Silcox 208
Office hours: Please Schedule an appointment using Appointment Manager
Phone: (843) 953-7291 (office)
Email: mickflyn@cofc.edu

Course meeting: Lecture: 340-01 M-W 2-3:15, JOHN 207
                 340-02 T-R 9:25-10:40 JOHN 206
Labs: Rooms 145 & 116 Silcox Center

Prerequisite courses: BIOL 201 Human Physiology
                     PEHD 201 Introduction to Physical Education or ATEP 245

Course Description: The major objective of this course is to assist the student in gaining an understanding and appreciation of the physiological and metabolic adaptations accompanying physical work.

Course Texts:


Older editions of books can be made to work, but the student will be responsible for finding the material.

IMPORTANT: Most of the lectures are provided as power point lectures on OAKS. They are provided to you so that you will print them out and have them available to make notes. The lectures will be paced under the assumption that you have printed out the slides. That is, slides will not appear long enough for you to copy everything. In addition, I will not honor requests to back up or slow down from students who have not printed out the slides. Most importantly, you may do well in this class without printing out the slides; however, I guarantee your learning will be better if you do print out the slides (which should make your grade higher). If I pace the course to allow
you to write down all the information on the slides, I cannot get through important concepts. I will deliver a few “old school” lectures while writing on the whiteboard, but these will be paced accordingly.

**Objectives:**

Help students develop critical thinking skills and their ability to apply what they know.

Apply physiological principles to the stress of exercise, exercise adaptations to stress, and interactions to disease risk reduction.

Provide a sampling of important topics in exercise physiology, including muscular, cardiovascular, bioenergetics, immune system, thermoregulation and special populations.

**Student Learning Outcomes:**

Upon successful completion of the course, the student will be able to:

1. Apply information from the literature to solve problems, as evidenced by their written narrative on a mini problem-based learning assignment and receiving a grade of 80% or higher.

2. Demonstrate their ability to problem solve by working in groups to develop a high-quality presentation at semester’s end and receiving a grade of 80% or higher.

3. Demonstrate their understanding of basic human physiology by their performance on online quizzes with an average quiz grade above 70%.

4. Discriminate and use their knowledge of physiologic responses to exercise and exercise training as evidenced by their performance on two 80 question exams and a comprehensive final exam with an average grade above 70%.

1. Identify key events in exercise physiology history and key people who contributed to the development of the field.
2. Understand the step-by-step process of muscle contraction, including energy provision, metabolite production, circulation, heat transfer, endocrine regulation, etc.
3. Be able to describe training-induced changes in skeletal muscle, the dynamic function of muscle and the contribution of different muscle fiber types to exercise.
4. Describe the innervation of skeletal muscle, conduction of a motor nerve impulse and know how the nervous system regulates contraction during exercise.
5. Have a working knowledge of cellular energy production by each of the three energy systems.
6. Be familiar with cardiovascular anatomy, blood delivery and distribution during exercise, basic ECG and cardiovascular adaptations to training.
7. Have a strong working knowledge of exercise prescription and methods of prescribing
exercise intensity for aerobic and resistance exercise.

8. Understand acclimation and acclimatization to exercise performed in extreme environments.

9. Be familiar with exercise responses of subjects in special populations (e.g., aging or chronic disease).

10. Be familiar with the physiology of the immune system and how it responds to moderate and extreme exercise.

11. Understand the physiological responses and symptoms of overtraining syndrome, the potential benefits of tapered or reduced training, and the rapid deterioration in fitness with cessation of training.

12. Be able to use class information, previous knowledge and outside research to solve problems in exercise physiology.

Tell me and I will forget, show me and I might remember... involve me and I will learn.

Chinese Proverb

Your instructor will make every effort to involve you in the learning process. This will include but will not be limited to, class warm-up topics, problem solving modules, putting students into small group discussions, calling on students for answers to questions posed, directing students to differences of opinion (e.g., instructor versus textbook), and encouraging students to ask questions or introduce information they bring from other sources. Please read chapter material in text book before coming to class. There will be announced and unannounced quizzes during the semester.

**Evaluation:**

Quizzes/Mini Problems 60 Announced and unannounced (no make ups allowed for quizzes).
Online quizzes 100 (must be taken within required time frame)
Exam 1 100
Exam 2 100
Problem-Based learning assignment 50
Final 100
Lab 180
Total 690

Online quizzes will be available on OAKS for selected dates. The online quizzes will **primarily test your knowledge of basic physiology.** The quiz time is set for 20 minutes, with a five minute grace period. Therefore it is necessary for you to review the chapter material prior to signing on for the quiz.

Problem Solving- You will be assigned to small groups, at random. You will work in these groups to find information to solve the problem.
For the mini-problem:
    You will present your work as a group, but each person will have their work identified and will be graded accordingly.
For problem-based learning:
You will give a group presentation, with each person responsible for a sub-section of the presentation. You will be graded on your individual presentation.

There will be clear instructions and a rubric for each assignment. Generally speaking, students who follow instructions perform better on these assignments.

**Exams** will be multi format… Multiple choice, true/false, short answer or short essay. The final exam will be comprehensive.

**Grading Scale:**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93+</td>
<td>A</td>
</tr>
<tr>
<td>90-92</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>84-86</td>
<td>B</td>
</tr>
<tr>
<td>80-83</td>
<td>B-</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
</tr>
<tr>
<td>74-76</td>
<td>C</td>
</tr>
<tr>
<td>70-73</td>
<td>C-</td>
</tr>
<tr>
<td>67-69</td>
<td>D+</td>
</tr>
<tr>
<td>64-66</td>
<td>D</td>
</tr>
<tr>
<td>60-63</td>
<td>D-</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>

**Lab** - The lab portion of the class is worth 180 points (~25%). The lab portion of your grade will be assigned by your lab instructor. Lab assignments and questions will be graded on standardized grading criteria posted on OAKS. Assignments are due at the start of lab. Late assignments will be penalized 10 points per day late.

You are **required to attend every lab period, while wearing appropriate clothing** (i.e. exercise clothing with athletic shoes). If you are not dressed appropriately, you will be counted as absent. If you participate in a College activity (athletics, attend a conference, etc) that will result in your missing lab, see your lab instructor at the start of the semester to make arrangements. If there are personal or medical reasons several classes are missed, the Dean of Students should be notified and the lab instructor should be informed. **Your full participation in all labs is expected and required (medical conditions will be excused with proper notification).**

If you have a problem with the lab, please speak with the lab instructor. If that problem is not resolved, you may speak with the lecture instructor.

**Make up policy** - In class quizzes cannot be made up for any reason. If you are late for class, you will not receive extra time for the quiz. Quizzes may be announced one week in advance or could be unannounced. Online lecture quizzes must be taken within the assigned time.

Exams- Make up exams will be permitted but the make-up exam will be more difficult than the regular exam.

If you miss a class you are responsible for getting the material from another student. The instructor will not provide handouts or lecture information for those who are absent.
Attendance- Attendance will be taken daily. **If you are late, you will be marked absent.** Students are expected to attend class. Two points will be deducted from your final grade for each absence after three. More than five absences will result in a WF (for excessive absences). **No excuses will be considered for absences.**

Seating- To expedite the attendance process and improve my ability to get to know student names, students will be assigned to seats. Please check the seating chart, on the second day of class, for your seat assignment.

Policies

**College of Charleston Student Handbook:** This is a guide to your responsibilities and rights as a student. If you are not familiar with this document, please take the time to review the information contained within the handbook. [www.cofc.edu/studentaffairs/general_info/studenthandbook.html](http://www.cofc.edu/studentaffairs/general_info/studenthandbook.html).

**Academic Honesty**- Please refer to the current College of Charleston Student Handbook for the definition of academic dishonesty and the subsequent penalties. Faculty members are required to report violations of the Honor Code to the Office of Student Affairs. If you are found guilty of an honor code violation your grade in the class will be XF and will be so indicated on your transcript. Students at College of Charleston are expected to be at all times in compliance with the Honor Code. Scholastic dishonesty will not be tolerated in this course. Examples of cheating include giving or receiving aid during examinations, using any type of crib sheet, copying from or looking to another exam, or submitting another’s work as your own.

**Classroom Behavior**- Students at the College of Charleston are expected to be at all times in compliance with the Honor Code. Failure to abide with this code will not be tolerated in this course. Examples of inappropriate classroom behavior include behaviors that disrupt instruction by the professor and/or learning of classmates and behaviors that threaten, harass, or discriminate against others. Students who engage in inappropriate classroom behavior will be asked to leave the classroom, will receive no credit for attendance and in-class activities for that day, and must meet with the instructor prior to returning to the next class meeting. Severe cases of inappropriate behavior will be referred to the Dean of Students for appropriate disciplinary action. **Please take a moment to use the bathroom before the start of class. Students leaving class can be disrupting.**

**Electronic Device Policy**- Please set your phones to silent during class. Calculators will be allowed during class and tests, but only **non-programmable calculators** will be allowed during tests (please purchase an inexpensive calculator for this purpose). You may **not** use your cell phone as a calculator. Texting is not permitted in class. Students caught texting will be warned (first time), dismissed and marked absent (second time), or receive a 10 point reduction on their final grade (third time). Laptop computers are NOT permitted during regular class. **There will be times when you are allowed to use your laptops or phones for class projects (e.g., problem solving), but phones and laptops should be stowed and set to silent all other times.**

**Disability**- In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to “reasonable accommodations.” Please notify the
instructor during the first week of class of any accommodations needed for the course.

**Tentative Class Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter (pages)</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>0</td>
<td>Intro and Historical Perspective</td>
</tr>
<tr>
<td>Week 2</td>
<td>0</td>
<td>Historical perspective (cont.)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Muscle structure and contraction</td>
</tr>
<tr>
<td>Week 3</td>
<td>8 (179-184)</td>
<td>Muscle contraction (cont).</td>
</tr>
<tr>
<td></td>
<td>(293-298)</td>
<td>Muscle action/dynamic function/fiber type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muscle signaling</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Mini Problem:</strong></td>
</tr>
<tr>
<td>Week 4</td>
<td>7</td>
<td>Neurological Control and exercise regulation</td>
</tr>
<tr>
<td>Week 5</td>
<td>(173-178; 160-161; 301-309)</td>
<td>Neuromuscular adaptation to physical stress Introduction to <strong>Problem-based learning</strong></td>
</tr>
<tr>
<td>Week 6</td>
<td>3</td>
<td>Bioenergetics</td>
</tr>
<tr>
<td>Week 7</td>
<td>3</td>
<td>Bioenergetics (cont) Energy Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Exam 1</strong></td>
</tr>
<tr>
<td>Week 8</td>
<td>3/4</td>
<td>Energy System (Glycolytic/Oxidative System</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Energy Systems (Oxidative, VO$_2$ max, EPOC)</td>
</tr>
<tr>
<td>Week 9</td>
<td>6</td>
<td>Exercise Immunology</td>
</tr>
<tr>
<td>Week 10</td>
<td></td>
<td>Spring break –no classes</td>
</tr>
<tr>
<td>Week 11</td>
<td>9</td>
<td>Cardiac Cycle and ECG</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Hemodynamics, blood flow during exercise</td>
</tr>
<tr>
<td>Week 12</td>
<td>9</td>
<td>Cardiovascular Adaptations to Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Exam 2</strong></td>
</tr>
<tr>
<td>Week 13</td>
<td>20</td>
<td>Laboratory assessment of Human Performance</td>
</tr>
</tbody>
</table>
Week 14
16
15 and 20
Exercise Prescription

Week 16
24
Environmental Stress—Heat, cold and altitude

Week 17 last two days of classes
Problem-based learning presentations

Final Exam Section 1 (M-W 2-3:15) Monday April 25th, 4-7 p.m.
Final Exam Section 2 (T-Th 9:25-10:40) Tuesday April 26th, 8-11 a.m.

You may not switch exam times. Please do not make plans to leave campus before your final exam.