ANP 403 LAB SYLLABUS
SUMMER 2017

Attendance and Participation Policy:
This is an upper level laboratory course. Students are required to attend and fully participate in lab each week. Labs are designed to provide a hands-on opportunity to study important physiological terms and concepts. While some material is unique to lab, each lab also integrates a significant amount of material from lecture to facilitate learning course content. The expectations are for you to become self-sufficient in learning the concepts and material associated with each lab. Failure to attend your assigned lab session will result in an automatic 10-point deduction from your lab grade. Failure to fully participate in lab may also result in point deduction at the discretion of the instructor.

Student Responsibility:
Students should come prepared for each lab period by: 1) having reviewed the previous information from each unit and 2) having at least skimmed assigned readings and reviewed any materials provided. Because of the nature of this course, you should expect to spend a great deal of time in independent study and review outside of lab. Because of the nature of the course, no make up quizzes will be given except under extraordinary circumstances and approved prior to the absence by the lab professor (when possible).

What do I do if I have to miss my regularly scheduled lab session?
Each week it is expected that you attend the lab section for which you are registered. However, there are certain circumstances that arise (e.g. funeral, documented illness, etc.) that may cause you to miss your regular lab session. If you are ill, you will be required to provide documentation from a health professional stating you were unable to attend your regularly scheduled class. Contact your lab professor via email or phone before your lab period. In your correspondence, provide the reason you must attend an alternate lab along with the section, day and time you wish to attend. Your lab professor will then contact the other professor to let her/him know you will be attending their section.

If a student misses a lab and cannot make another lab during the same week and she/he has a legitimate excuse, students can make up their lost points by writing a 2-3 page paper on a primary literature article (full text) from the missed weeks area of physiology. The paper should be typed, single - paced, 1-inch margins, and properly cited with AMA (American Medical Association) style of citation.

The paper must include:
- The hypothesis or research question stated.
- Experimental design (the research methods and materials used - very brief).
- Summarize the results or significant findings.
- The interpretation of how the results discovered will aide the area and our knowledge of physiology.

Grading:
Your lab grade is worth a total of 165 points, which is combined with your lecture point total to determine your final grade in the course. There is no separate grade given for lab. Lab points are earned from the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Lab Summaries (15 pts. each)</td>
<td>60</td>
</tr>
<tr>
<td>3 Presentations (10 pts. each)</td>
<td>30</td>
</tr>
<tr>
<td>5 Lab Quizzes (15 pts. each)</td>
<td>75</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>165</strong></td>
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</tbody>
</table>

Please review the ANP403 lecture syllabus for further information on grading, course objectives, etc.
**Food or Drink in Labs:**

Food and/or drink is not permitted in the Jaharis laboratories where chemical, biological, and/or radiological materials are used or stored. The main reasons why eating and drinking are not permitted in any laboratory using or storing hazardous materials are a personal safety risk and risks of non-compliance with regulatory agencies and granting agency requirements that may impact an individual, a work unit, or the institution as a whole. Personal safety risks can result from cross-contamination and ingestion. For example, gloves worn outside the lab; airborne materials settling out or condensing on food surfaces and utensils; consumable items placed on a contaminated surface; rubbing the eye, nail biting, nose blowing, or adjusting contact lenses. If a laboratory experiment contains ingesting food or drink, the laboratory staff and professors will prepare and administer such food or drink.

**Lab Quizzes (15 Points Each):**

Lab quizzes will be given on the dates specified on the lab schedule and will cover the information from the previous week’s lab. Quizzes will be given at the beginning of the lab period and cannot be made up at any other time. The content of all lab quizzes will be based on the weekly learning objectives, general aspects of the lab experiments, lecture material, and questions pertaining to group presentations will be included when appropriate.

**Lab Summaries (15 Points Each):**

- Lab summaries must be typed. Handwritten summaries will not be accepted.
- Single-spaced, 1” margins, 12 font, and double-sided.
- Must be a minimum of 1 page with a maximum of 2 pages of text. Focus on the quality of content and your ability to synthesize the information not the length. Points can be deducted if a summary is more than 4 pages of text.
- Data and results must be presented via tables, figures or graphs created in Microsoft Word, Microsoft Excel or similar programs. Graphs are preferred whenever appropriate.
- Graphs, figures, tables, etc. are NOT included in the total number of pages of text.
- Weekly learning objectives for the majority of the labs are provided. Please use them as a checkpoint of comprehension.
- Properly cited with AMA (American Medical Association) style of citation.

**Concise summary of the following:**

- Purpose of experiments and/or activities conducted. (1 point)
- Methods and materials used in experiment. This should not be more than a paragraph in length. (1 point)
- Clear presentation of the results/data. (3 points)
  Utilization of tables, figures, and graphs. Figures should be properly labeled and look professional.

Points will be deducted if the following items are not incorporated into the summary:

- Descriptive title on X/Y axes of graphs.
- Brief captions explaining what is being presented on graphs (No more than 1-2 lines of text).
- Figures are numbered. (i.e., Figure 1, Figure 2)

- Discussion and interpretation of the results. (10 points)
  Do the results make sense? Why or Why not? Based on your knowledge from lecture and beyond, what was expected to happen? Relate your results to concepts learned in lecture. Propose reasons as to why the expected results did not happen? Summary has very few grammatical errors. If summary does not flow well or there are many typo’s, errors, or poor sentence structure points will be deducted at the discretion of the instructor.
Primary Literature Presentations (10 Points Each):
- All presentations will be from primary literature articles. If a primary literature article is not used points will be deducted.
- Presentation groups will consist of 3-4 students. You will remain in your chosen groups for all presentations.
- All presentations must be completed using Microsoft PowerPoint or a similar program.
- A two-sided paper copy of your presentation (3 slides per page) must be submitted at the time of your presentation.
- Presentations are to be 15-20 minutes in length. If the presentation ends 2 minutes prior or after the allotted time, points will be deducted.
- Each group member must actively and equally participate and verbally present a portion of the discussion. Each group member will receive the same grade for the presentations.
- One question from each group’s presentation will be presented on quizzes (when appropriate) in a multiple choice format. The lab professor will create the questions based off the group’s PowerPoint (or similar format) presentation.
- The presentation should include slides on the following information:
  
  **Introduction:**
  - Background information, definition of key words, research goal(s), hypotheses, etc.
  - Why is this research important? Why should your audience take interest?

  **Methods and Materials:**
  - Very brief (1-2 slides) explanation of the general experimental techniques implemented in the studies. Goal of each technique?

  **Results:**
  - Be able to adequately present and explain the figures provided within the chosen articles.
  - Please cut/paste/crop figures that they can be included in the presentation. Figures must be included. No “text” discussion of figures. A picture is worth a 1,000 words!

  **Discussion and Conclusions:**
  - Interpretation of results. What can be concluded from the results?
  - What are the main conclusions?
  - How does this study contribute to our understanding of physiology being studied?

  **Future Research Directions:**
  - What aspect(s) of the research study may be explored further?
  - Based on the findings, what are the next logical steps?

Summary of Lab Learning Objectives:
Be able to explain the answers to the following questions in sufficient detail for the quizzes. Questions below should be related to the discussion of your data in the lab summaries when appropriate. Refer to lecture notes, textbooks, and lab handouts.

**Lab #1: Movement of Materials Lab: Osmosis, Diffusion & Tonicity**
- In terms of hydrostatic and osmotic pressures, why does the level of solution in the thistle tube change over time?
- Factors that influence diffusion rate are temperature, molecular weight, viscosity, thickness and permeability of membrane, concentration and electrical gradient. Based on your knowledge of chemistry, how will the above factors affect the diffusion rate of molecules?
- In regards to part C, what accounts for RBC hemolysis and crenation upon deviation from 0.9%NaCl? Be able to explain terms of osmolarity. What happens to RBC’s when placed in a hypertonic,
hypotonic and isoosmotic solution.

**Lab #3: Biopac Tutorial**

Focus on the pages below in the Biopac Lab Manual:

- Read Introduction: pp. 2-4
- Sample Data Files / BSL Display: pp.5-6 *(please use the handout for finding the tutorial)*
- Display Tools / Axis Grid Controls: pp.7-13
- Measurements: pp.14-17 (18-22 measurement tools definitions)
- Append & Event Markers: pp.22-23
- Quit BSL / Running a Lesson: pp. 35-42

**Lab #3: Sensory System & Reflexes and Spinal Cord Reflexes Lesson #20**

- Explain what determines 2-point threshold and sensory acuity.
- Explain the physiological phenomenon of adaptation.
- Explain the difference between monosynaptic (myotatic) and polysynaptic reflexes.
- Explain reasons for a positive Babinski reflex in infant and adult. *(Research Details)*
- Explain how and why near point changes with increased age.
- Explain the physiological/anatomical basis for the pupillary light reflex. *(Research Details)*
- Discuss the roles of all sensory inputs that contribute to equilibrium and maintaining balance in upright position when in motion and when standing still.
- Explain how semicircular canals function to detect rotational acceleration and to produce dizziness after spinning.
- Be able to list the anatomical components of a reflex pathway from beginning to end.
- Be able to explain the difference between an ipsilateral reflex and a contralateral reflex.

**Lab #5: Skeletal Muscle & Electromyography EMG Biopac Lessons #1 & 2**

- Define and explain the physiological significance of muscle tonus.
- Explain the physiological basis for the increase in EMG recording and force produced during the lab.
- Explain the physiological basis for the relationship between amount of force produced and amount of control of movement.
- Explain the concept of muscle fatigue and the physiological process of a decline in strength.
Lab #6: Cardiovascular Function & Electrocardiography (ECG) I Biopac Lesson #5

▪ What electrical events of the heart coincide with each respective component of an EKG recording? P wave? QRS complex? T wave?

▪ What are the components of the electrical conduction system of the heart? Know the flow of electrical current through the heart.

▪ What is the physiology underlying the changes in mean arterial blood pressure and heart rate that occur with changes in posture?
  ➢ Review baroreceptors. What is the role of baroreceptors in the regulation of blood pressure when performing postural changes?

▪ What is the physiology underlying the changes in systolic and diastolic blood pressure that occur pre/post exercise?

▪ Explain the physiology underlying changes in heart rate that occur during deep inspiration and expiration.

▪ Explain the change in duration of systole and diastole with an increase in heart rate. Explain what problem arises from changes in duration at very high heart rates (HR > 200 bpm) and why this problem does not occur during exercise?

Lab #8: Pulmonary Function I&II Biopac Lessons #12 & 13

▪ Be able to label and/or draw the respiratory volumes and capacities chart.

▪ Understand how and why tidal volume, vital capacity, inspiratory reserve volume, expiratory reserve volume, functional residual volume, residual volume, and FEV1.0 are affected by exercise, obstructive pulmonary disease, and restrictive pulmonary disease.

▪ Explain why problems with respiration can produce pH imbalances within the body.

▪ Explain how respiration compensates for metabolic acidosis and metabolic alkalosis.

Lab #9: Urinalysis Experiment

▪ Know what substances/cells should and should not be in urine. If one of the substances/cells tested for should not be in the urine, be able to explain specifically why not. Explain the reasons why someone could have these substances/cells present in the urine that should not be there.

▪ Be able to thoroughly explain the hormonal regulation of urine formation, including regulation of hormone release, the glands involved, and specific mechanisms of action of the hormones.

▪ Be able to explain the concepts of kidney function, and hormonal regulation of urine formation of the various groups in the urinalysis experiment.

Accommodations for Disabilities:
Students with documented disabilities who may need accommodations or any student considering obtaining documentation should contact the Walter Young Center and make an appointment with Ms. Martha Bledsoe, Director of Services for Students with Disabilities. Ms. Bledsoe can be reached by calling (262) 524-7335 or via e-mail at mbledsoe@carrollu.edu. Instructors will make the appropriate accommodations once notification has been received.
The instructor and the University reserve the right to modify, amend, or change the syllabus (schedule, course requirements, grading policy, etc.) as student progress, as the curriculum and/or program require(s).

ANP 403 Laboratory Schedule  
Lab is located in the Jaharis Science Building Room 019

<table>
<thead>
<tr>
<th>Date</th>
<th>Lab</th>
<th>Assignment/Quiz</th>
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<tbody>
<tr>
<td>June 5</td>
<td>Lab #1: Movement of Materials Experiment: Osmosis, Diffusion &amp; Tonicity</td>
<td>(Solutions Worksheet Assigned in Lectures)</td>
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<tr>
<td>June 12</td>
<td>Lab #2: Primary Lit. Presentation: Nervous System</td>
<td>Quiz #1 (Movement of Materials &amp; Worksheet)</td>
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<td></td>
<td>Lab #3: Sensory System &amp; Reflexes</td>
<td>Lab Summary #1 Movement of Materials Due</td>
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<td></td>
<td>Biopac Tutorial &amp; Spinal Cord Reflexes Lesson #20</td>
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<tr>
<td>June 19</td>
<td>Lab #4: Primary Lit. Presentation: Endocrinology</td>
<td>Quiz #2 (Sensory System, Reflexes &amp; N.S. Pres.)</td>
</tr>
<tr>
<td>July 3</td>
<td>Lab #5: Skeletal Muscle Electromyography EMG Lesson #1 &amp; 2</td>
<td>Quiz #3 (Skeletal Muscle (EMG) &amp; Endo. Pres.)</td>
</tr>
<tr>
<td>July 10</td>
<td>Lab #6: Cardiovascular Function Lesson #5</td>
<td>Lab Summary #2 Skeletal Muscle Due</td>
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<tr>
<td>July 17</td>
<td>Lab #7: Primary Lit. Presentations: Cardiovascular</td>
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<tr>
<td>July 24</td>
<td>Lab #8: Pulmonary Function Lesson #12 &amp; 13</td>
<td>Quiz #4 (Cardio. Function &amp; Cardio Pres.)</td>
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<td>Lab Summary #3 Cardiovascular Due</td>
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<tr>
<td>July 31</td>
<td>Lab #9: Urinalysis Experiment</td>
<td>Quiz #5 (Pulmonary Function)</td>
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<tr>
<td>Aug. 7</td>
<td>Lab #10: Digestive Integrated Case Study &amp; Reproductive Case Study</td>
<td>Lab Summary #4 Urinalysis Due</td>
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<thead>
<tr>
<th>Section</th>
<th>Instructor Information</th>
<th>Lab Day / Time / Location</th>
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| Y       | Professor Liz Wilson
Email: ewilson@carrollu.edu
Phone: 630-709-9864
Office Hours: After Labs or by Appt. | Monday 12:30-3:30 pm
SCI 019                                      |