Attribute: COLL 400, satisfies major writing req. in Kinesiology & Health Sciences

Goals:

1) In-depth understanding of the current scientific knowledge of the following physiological processes:
   a) body weight regulation including neural and hormonal control of appetite and metabolism
   b) mechanisms of diseases that are associated with obesity and inactivity (from systems level to molecules)
   c) the role of the fat cell and its secretions in the disease process
   d) the current treatments for these diseases and the role of exercise

2) Refine skills in understanding, evaluating, and presenting science literature

3) Construct an original research proposal, and oral presentation of the proposal

Format: A seminar course that combines lectures and class discussion. This is an advanced physiology course that assumes a basic background in physiology and/or cell biology.

Prerequisites: Human Physiology (KINE 204) or Introduction to Molecules, Cell and Development (BIOL 225)

Grading

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<tr>
<th>Component</th>
<th>Points</th>
<th>Description</th>
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<tr>
<td>Research Paper Discussions</td>
<td>80 pts.</td>
<td>Weekly (8 total, 10 pts. each)</td>
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<tr>
<td>Written Research Proposal</td>
<td>80 pts.</td>
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<tr>
<td>Oral Presentation</td>
<td>40 pts.</td>
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<tr>
<td>Ask Questions</td>
<td>10 pts.</td>
<td>(5 questions, 2 pts. each)</td>
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<tr>
<td>Mid-term Test</td>
<td>40 pts.</td>
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<tr>
<td>Final Exam (Comprehensive)</td>
<td>40 pts.</td>
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<td><strong>TOTAL:</strong></td>
<td>290 pts.</td>
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Tests: Tests are multiple-choice, but you have the opportunity to explain any answer an potentially earn partial credit. It is possible to take the mid-term early (if pre-arranged ~1 week in advance with instructor). Late mid-term is allowed in case of illness or personal hardship (as approved by Dean of Students). It is also allowed by choice, but will result in a point deduction (5% if taken within 1 week, 10% after 1 week). Alternate final exam dates require approval by the Dean of Students.
**Paper Discussions:**

Paper discussions will consist of reading an assigned original research paper, and presenting an assigned figure/table with your small group *(10 pts. each paper, 80 pts. total)*.

Your figure/table presentation should include:
1) the purpose of the experiments
2) the methods/approach used (if not obvious)
3) the significance of the data and its importance to the paper overall
4) any limitations of the data

In class format:
1) instructor will present the background, hypothesis, and general methods of the paper
2) your small group will have some time to organize your figure/table presentation
3) small groups will then present figures to class
4) instructor will present conclusions, significance, limitations

**Missed Discussions:** If you are going to miss a paper discussion, you may turn in a detailed written analysis (~4 pages; essay style) which includes the purpose/hypothesis of the paper, an explanation of the data and significance of each figure/table, and overall conclusions, significance, and limitations of the paper. The analysis is **due by 5:00 on the day of the discussion**, or points will be deducted (5% if turned in within 1 week, 10% after 1 week). **You will only be able to take this option for 2 paper discussions.** If you miss more than 2 paper discussions, there is no opportunity to make-up the work.

**Course Project:**

Students will write a research proposal *(80 pts)* on one of the topics discussed in class and present it to the class *(40 pts)* in a way that a non-scientist could understand. The written proposal will include:

a) Abstract written in lay-person terms.
b) Background on the topic, including all previous relevant studies performed on the topic, detailed explanations of the pathways/processes being studied, rationale for the proposed experiment.
c) Hypothesis (sufficiently focused that it can be tested with a few experiments)
d) Study Design (explain the experimental design, test subjects/model, methods used)
e) Potential results and what they would mean (consider all experimental outcomes)
f) Significance of the study (what would it contribute to our knowledge)

The oral presentation should:

a) be ~15 minutes in length (~10 Powerpoint Slides)
b) be composed to communicate with a lay audience
c) include the a simple visual model of the pathway, process, or problem to be examined
d) a clear rationale for the study and why the question is important
Ask Questions: You will be expected to ask a total of 5 questions during the student talks (2 pts. each, 10 pts. total). You will turn in a written copy of your question/s to the instructor at the end of the class period on the days you ask your question/s.

Topics:

I. Overview of Diseases of Obesity/Inactivity in U.S., Metabolic Syndrome
II. Neural and Hormonal Control of Appetite and Metabolism
III. Causes of Obesity and Treatments
IV. Adipose Tissue and Adipocytokines
V. Physiological and molecular mechanisms of Type-II diabetes, and how exercise and weight reduction counteract its effects
VI. Physiological and molecular mechanisms of hyperlipidemia (high blood lipids and cholesterol) and methods of treatment
VII. Physiological and molecular mechanisms of hypertension (high blood pressure) and methods of treatment
VIII. Physiological and molecular mechanisms of cardiovascular disease, and how exercise and weight reduction counteract its effects

Additional Resources (Information from these sites can be cited in your paper):

American Heart Association (www.americanheart.org)
National Heart, Lung, and Blood Institute (www.nhlbi.nih.gov)
National Institute of Diabetes and Digestive and Kidney Diseases (www.niddk.nih.gov)
American Diabetes Association (www.diabetes.org)
Center for Disease Control (cdc.gov)

Accommodations: It is the policy of William & Mary to accommodate students with disabilities and qualifying diagnosed conditions in accordance with federal and state laws. Any student who feels s/he may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at sas@wm.edu to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please visit www.wm.edu/sas.
Physiology of Obesity - Spring 2018 Schedule

Thurs., Jan. 18  Lecture #1: Overview of Diseases of Obesity/Inactivity in U.S.

Tues., Jan. 23  Lecture #2: Neural and Hormonal Control of Appetite and Metabolism
Thurs., Jan. 25  Paper #1 and general information about scientific journals

Tues., Jan. 30  Lecture #3: Causes of Obesity
Thurs., Feb. 1  Paper #2  [Project Topic Due]

Tues., Feb. 6  Lecture #4: Treatments of Obesity, Abdominal Obesity
Thurs., Feb. 8  Paper #3

Tues., Feb. 13  Lecture #5: Adipocytokines, Leptin Resistance
Thurs., Feb. 15  Paper #4

Tues., Feb. 20  Lecture #6: Brown Adipose Tissue, Diabetes - Mechanisms
Thurs., Feb. 22  Paper #5

Tues., Feb. 27  Lecture #7: Diabetes – Mechanisms and Treatments [First Draft Due]
Thurs., Mar. 1  Paper #6

SPRING BREAK

Tues., Mar. 13  Mid-Term Test
Thurs., Mar. 15  Lecture #8: Genetics/Epigenetics of Diabetes and Obesity, Dyslipidemia

Tues., Mar. 20  Lecture #9: Hypertension
Thurs., Mar. 22  Paper #7

Tues., Mar. 27  Lecture #10: Cardiovascular Disease
Thurs., Mar. 29  Paper #8

Tues., Apr. 3  Lecture #11: Cardiovascular Disease
Thurs., Apr. 5  TBA  [Second Draft Due]

Tues., Apr. 10  Student Presentations
Thurs., April 12  Student Presentations

Tues., April 17  Student Presentations
Thurs., April 19  Student Presentations

Tues., April 24  Student Presentations
Thurs., April 26  Student Presentations

Final Exam  Thurs., May 3, 2:00-5:00 (Subject to Change)