

SYLLABUS - PHYSIOLOGY OF OBESITY, SPRING 2018  
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**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**

Research Paper Discussions	80 pts.	Weekly (8 total, 10 pts. each)
Written Research Proposal	80 pts.	
Oral Presentation	40 pts.	
Ask Questions	10 pts.	(5 questions, 2 pts. each)
Mid-term Test	40 pts.	
Final Exam (Comprehensive)	<u>40 pts.</u>	
TOTAL:	290 pts.	

**Tests:** Tests are multiple-choice, but you have the opportunity to explain any answer and 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

- e) simple explanations of the approaches and techniques to be used and their limitations
- f) predicted results and what they would mean

**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](http://www.americanheart.org))  
National Heart, Lung, and Blood Institute ([www.nhlbi.nih.gov](http://www.nhlbi.nih.gov))  
National Institute of Diabetes and Digestive and Kidney Diseases ([www.niddk.nih.gov](http://www.niddk.nih.gov))  
American Diabetes Association ([www.diabetes.org](http://www.diabetes.org))  
Center for Disease Control ([cdc.gov](http://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](mailto: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](http://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 Thurs., Jan. 25	Lecture #2: Neural and Hormonal Control of Appetite and Metabolism Paper #1 and general information about scientific journals
Tues., Jan. 30 Thurs., Feb. 1	Lecture #3: Causes of Obesity Paper #2 <span style="float: right;">[Project Topic Due]</span>
Tues., Feb. 6 Thurs., Feb. 8	Lecture #4: Treatments of Obesity, Abdominal Obesity Paper #3
Tues., Feb. 13 Thurs., Feb. 15	Lecture #5: Adipocytokines, Leptin Resistance Paper #4
Tues., Feb. 20 Thurs., Feb. 22	Lecture #6: Brown Adipose Tissue, Diabetes - Mechanisms Paper #5
Tue., Feb. 27 Thurs., Mar. 1	Lecture #7: Diabetes – Mechanisms and Treatments <span style="float: right;">[First Draft Due]</span> Paper #6

### SPRING BREAK

Tues., Mar. 13 Thurs., Mar. 15	<b>Mid-Term Test</b> Lecture #8: Genetics/Epigenetics of Diabetes and Obesity, Dyslipidemia
Tues., Mar. 20 Thurs., Mar. 22	Lecture #9: Hypertension Paper #7
Tues., Mar. 27 Thurs., Mar. 29	Lecture #10: Cardiovascular Disease Paper #8
Tues., Apr. 3 Thurs., Apr. 5	Lecture #11: Cardiovascular Disease TBA <span style="float: right;">[Second Draft Due]</span>
Tues., Apr. 10 Thurs., April 12	Student Presentations Student Presentations
Tues., April 17 Thurs., April 19	Student Presentations Student Presentations
Tues., April 24 Thurs., April 26	Student Presentations Student Presentations
<b>Final Exam</b>	<b>Thurs., May 3, 2:00-5:00 (Subject to Change)</b>