**NSM220 - Human Biology, Health and Disease**

**Spring 2014**

**Classroom** – Mon, Wed, Fri 8:00-9:00 AM KOSC 109

**Lab** – Tuesdays 3:00-5:00 PM KOSC 307

**INSTRUCTORS**

Craig M. Story, Ph.D. Course instructor. x4393 craig.story@gordon.edu

 Spring 2014 Office Hours: MWF 9:10 -10:10; MW 11:30-12:30; Tues 3-5

 “GordonBioProf” may be available for text IM on Skype during office hours and at other times

Jennifer Noseworthy, Ph.D. Lab instructor. x4885 jennifer.noseworthy@gordon.edu

 Office-KOSC 314. Hours: MW 1:00-2:10pm; Th 9:45-11:20am

Teaching Assistant: Alverina Berube, Biology Major alverina.berube@gordon.edu

**COURSE WEB SITE** May be accessed through blackboard: <http://blackboard.gordon.edu>. Visit the Bb site frequently to keep up on how you are doing! Your current grade will be posted there, it is the weighted grade not the “total” points that you should focus on.

**REQUIRED TEXTS and MATERIALS**

1) Mader, Sylvia S. and Michael Windelspecht. Human Biology, 12th Edition, McGraw Hill, 2012 0073525464. Book Site: <http://highered.mcgraw-hill.com/sites/0073525464/information_center_view0/>

2) Human Biology Lab Manual (new 2014 Edition) By Craig Story and Jennifer Noseworthy

 These cost $10.00 and will be distributed during the first lab session Tuesday, January 20.

 Bring $10 cash with you to lab on Jan 20.

3) Personal Response System – You will need to obtain a turning point clicker. If you are ordering online, be sure to order the Turning Technologies “NXT” model. The “response card XR” is not recommended. You will be responsible to make sure there is a fresh battery in it. ☺

4) Bouma, Hessel – Readings on Human Biology and Christian Viewpoints. Please take care of these booklets as they will be collected at the end of the semester for use by future classes.

**COURSE GOALS**

As revealed in scripture, all life, and in a special way, human life is a creation of God. Clearly our bodies are of great value and require our careful maintenance and stewardship. Gaining a deeper scientific understanding of how your body functions will help you become a better caretaker of this great gift. We hope you keep this perspective in mind as you read and meditate daily upon the material of the course.

A major secondary goal of this course is to focus on clear and concise written and oral communication. Throughout the course you will have many opportunities to provide examples of your writing. These will be critiqued with the goal of helping you improve in the area of written communication, particularly as it relates to making a persuasive argument on a scientific topic. One major paper with opportunities for multiple drafts will be done in this course.

**SPECIFIC OBJECTIVES**

This course is designed to accomplish the preceding goal by focusing on the following specific objectives:

1. To introduce the concept of **internal** **regulation**, called homeostasis, and give many examples of how this balance is achieved.

2. To stress the relationship of **structure** to function at all levels of organization from macromolecules to organ systems.

3. To gain an understanding of molecular, cellular and physiological mechanisms that make possible the efficient acquisition, transformation and utilization of **energy** from food sources.

4. To become familiar with the key aspects of the major **body systems**, including: cardiovascular, immune, skeletal, muscular, digestive, respiratory, urinary, nervous, endocrine, and reproductive systems.

5. To become familiar with the basic cellular structures that manufacture **proteins**, the key macromolecules of body structure.

6. To become familiar with recent advances in biomedical technology in the diagnosis and treatment of human genetic **diseases** including cancer, as well as parasitic, viral and bacterial illness.

7. To understand how the **experimental method** is used to gain scientific knowledge by hands-on work in the laboratory and class discussions.

8. To see how understanding science can inform our discussions of important ethical and **moral issues** currently debated in the public arena, through written assignments and active discussion.

9. To think critically about how the human species fits in with the rest of **the natural world**, in terms of global ecology, evolutionary history, human population growth and resource depletion, and discuss various viewpoints on these issues.

**COURSE PROCEDURES**

**Classroom activities (lecture/question and answer) and ProfCasts**

The following tips and suggestions will help you to succeed maximally in this course, therefore, please pay close attention to this section. Attendance at every single lecture is required. Historically, a major reason for poor performance is missing class. You are responsible for all of the material covered in-class, in labs, and in the assigned readings. Always take the time to answer the questions at the end of each assigned chapter. Make note cards of key vocabulary terms, and LEARN them. Obtaining the vocabulary is the first and necessary step that will allow you to comprehend of the concepts discussed in-class. You may bring questions with you to class for discussion at the opening of the class time. You also should use the book companion website to help you learn the vocabulary and check your level of mastery through the on-line quizzes (see below: Internet Resources).

Reading Guides are posted on Bb. These are intended to highlight the *key concepts* to focus on from each chapter, approximately one page long. These are the central concepts, terminology and ideas that you must grasp and *understand* to do well in the course. These guides can help you be prepared for class, and it is expected that you review this material before coming to lecture. I realize sometimes time is tight and students sometimes don’t get to prepare well for class. These sheets can help guide you if you have limited time to prepare for class, as it will direct your study efforts to the most critical ideas.

ProfCasts for each chapter are available for downloading before or after class as you see fit. I made these a number of years ago, and some students have found them to be very helpful. In each Profcast, I moved through the chapters and emphasize what to focus your studying time on. These ProfCasts are fast paced, however you will have the ability to pause, rewind and take it in at your own pace, and review them as many times as you wish using the iTunes interface or any video playback device.

**Use of Technology in Class**

My policy for computer use in class is that you certainly may use it for class-related activities, such as taking notes, or looking up material directly related to class, but please avoid use of electronic device for activities unrelated to class. This will not only cause you to be distracted, but also those around you. If you know computers/phones are a distraction to you, please remove that temptation during the class time. Each of you should make it a challenge to ask one question per week during class, and write down at least one question that arises during lecture every class.

**Internet Resources**

The companion website for the text is a valuable resource (link above). Bookmark it and visit often. This site comes complete with animations, notes, study guide helps, practice tests—you name it, they've got it. There is simply no lack of study resources with this course. You are strongly encouraged to visit this site and plan to study there on a daily basis. There are many other good sources of information on the web, however, be a careful consumer; not all information may be accurate, unbiased, and up-to-date. If you find a useful online resource, please feel free to send it to the professor for distribution to your classmates.

**Quizzes and use of a Personal Response System (PRS)**

You will be continually evaluated throughout the course, not to annoy you, but rather, so both you and I will be aware of how you are doing in your pursuit of excellence. To facilitate this, “clickers” will be used to assess current understanding of the class. Through use of the clickers and the immediate feedback it gives, you will be able to compare your own understanding with your classmates, and be able to make the necessary adjustments to your studying practices. A side benefit to the clicker is that you will get a **participation grade** for being in class and clicking in some fraction of the responses, whether or not you got the answers correct.

Sometimes missing a class is unavoidable. Therefore, three quizzes will be excused over the course of the semester. This is automatically done by Bb. This benefits everyone, as the three lowest quiz grades will automatically be ignored by Blackboard as it calculates your weighted grade. Make up quizzes are not feasible and will not be offered, so please do not ask for special consideration, and realize that part of this is to encourage you to come to class on time. I promise you will find the classes stimulating and helpful.

Remember, quizzes are a significant fraction of your final grade (10%). Likewise, short quizzes at the start of lab are a tool to ensure you get there on time, and are prepared.

**Learning Teams and Discussion Groups**

We will make frequent use of **learning teams** during class. This is a way to help encourage active thinking and participation during each class, rather than passive observation. We will set up teams after folks have “decided” on their preferred seating. Your team of 2 or 3 will choose a name of a part of the body (bone, muscle, nerve, organ, etc.). These learning teams will be combined to form **discussion groups** for the moral issues discussions.

Learning Team = two or three students [20 students: 4 of 3 + 4 of 2 = 8 teams]

Discussion Group = two learning teams together (4-6 students)

**Exams**

Three in-class exams and one final exam will be given according to the schedule below. These are multiple-choice/scantron exams that are designed to test your mastery of the material for that segment of the course. Some questions test how well you know the definitions of key terms, others will test your comprehension of concepts discussed, and others will encourage you to apply your knowledge to new situations. Make-up exams will be arranged **only** if the instructor is contacted by email well in advance of the scheduled exam time. These should be taken within two days of the scheduled date and time.

**End of Semester Assignment**

Students will choose a topic to investigate more deeply and write a 5-page paper that concisely explores the topic. Further details of this paper will be provided separately. The purpose of the paper will be to help students improve their writing skills, as well as deepen their knowledge of a subject of interest. There will be an in-class presentation near the end of the semester, and we will all benefit from hearing about each topic. This is always a highlight of the course.

**LABORATORY PROCEDURES**

Laboratory will meet at scheduled times during the semester as noted in the syllabus. There is no lab on Mar 11, or May 6, which is a “Thursday.” Attendance in lab is mandatory, and important. Some labs have work that must be completed before arriving, so look closely at the lab well in advance. **Make-up labs are not offered for logistical reasons**. Institutionally valid excuses will be honored. Please communicate with the lab instructor in person and follow up with e-mail.

**EVALUATION**

Grades are weighted as follows: category in Bb

In-class Quizzes/Participation Assessment 10% of final grade

Four Exams Test 10% of final grade each (40% total)

Lab Assignments Lab 30% of final grade

Ethical Issue Reader Assignments Moral Reader 10% of final grade

Big Paper/presentation Big Paper 10% of final grade

Bonus assignment: Up to 2% added to your final grade (scaled from a 25 point service-learning assignment)

**Letter grades** will be assigned at the end of the course based upon the **weighted percentages**\* achieved in each of the above evaluation areas according to the table below. Exams are not “scaled.”

Minimum %, letter grade:

96.7% A+ 93% A 90% A- 86.7% B+ 83.3% B 80% B- 76.7% C+

73.3% C 70% C- 66.7% D+ 63.3% D 60% D- < 60% F

**STUDENTS WITH DISABILITIES**

Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412 X4746) to:
	1. make sure documentation of your disability is on file in the ASC,
	2. discuss the accommodations for which you are eligible,
	3. discuss the procedures for obtaining the accommodations, and
	4. obtain a **Faculty Notification Form**.
2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester;* at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. See Grievance Procedures available from the ASC.

**COURSE OUTLINE** *Text readings are from Mader 12th Edition for 2014.*

**#Day DATE TOPIC READING**

1W 1/15 Exploring Life and Science Mader Ch 1

2F 1/17 Chemistry of Life Mader Ch 2

 **1/21 Week 2 Lab: The Scientific Method**

3W 1/22 Cell Structure and Function I Mader Ch 3

4F 1/24 Cell Structure and Function II Mader Ch 3

5M 1/27 Organization and Regulation of Body Systems Mader Ch 4

 **1/28 Week 3 Lab: Macromolecules Discussion and Film: Life Story**

*6W 1/29 Created “In the Image of God” in-class discussion Reader #1*

7F 1/31 Cardiovascular System: Heart and Blood Vessels Mader Ch 5

8M 2/3 Catch up/review

 **2/4 Week 4 Lab: Microscopy and the Heart**

9W 2/5 Exam #2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

10F 2/7 Blood Mader Ch 6

11M 2/10 Lymphatic System Mader Ch 7

 **2/11 Week 5 Lab: Blood**

12W 2/12 Infectious Disease Inf Dis Suppl

13F 2/14 Digestive System and Nutrition I Mader Ch 8a

14M 2/17 Digestive System and Nutrition II Mader Ch 8b

 **2/18 Week 6 Lab: Nutrition**

15W 2/19 Respiratory System Mader Ch 9

16F 2/21 Urinary System and Excretion Mader Ch 10

17M 2/24 Skeletal System Mader Ch 11

 **2/25 Week 7 Lab: Histology, Microscopy**

*18W 2/26 Moral Choices in-class discussion Reader #2*

19F 2/28 Muscular System Mader Ch 12

20M 3/3 Review/Catch up

 **3/4 Week 8 lab: Mammalian organ systems, dissection**

21W 3/5 Exam #2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Spring Break

22M 3/17 The Nervous System Mader Ch 13

 **3/18 Week 9: Nervous System and Reflexes**

*23W 3/19 Human Experimentation in-class discussion Reader #4*

24F 3/21 Human Senses Mader Ch 14

25M 3/24 Endocrine System Mader Ch 15

 **3/25 Week 10 Lab: Exercise (MEET IN GYM!)**

26W 3/26 Reproductive System I Mader Ch 16

27F 3/28 Reproductive System II Mader Ch 16

28M 3/31 Development and Aging Mader Ch 17

 **4/11 Week 11 Lab: Amour (film)**

*29W 4/2 Reproductive Choices in-class discussion Reader #5*

30F 4/4 Patterns of Chromosomal Inheritance I Mader Ch 18

**#Day DATE TOPIC READING**

31M 4/7 Patterns of Chromosomal Inheritance II Mader Ch 18

 **4/8 Week 12 Lab: Chromosomes**

32W 4/9 Exam #3 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

33F 4/11 Cancer Mader Ch 19

34M 4/14 Patterns of Genetic Inheritance Mader Ch 20

 **4/15 Week 13 Lab: Your Own Genetics/Blood typing**

35W 4/16 DNA Biology and Technology I Mader Ch 21

Easter break

 **4/22 Week 14 Lab: Lorenzo’s Oil (film)**

*36W 4/23 Gene Therapy in-class discussion Reader #6*

37F 4/25 DNA Biology and Technology II Mader Ch 21

38M 4/28 Human Evolution Mader Ch 22

 **4/29 Week 15 Lab: The Human Family Tree (film)**

 4/30 Presentations part I.

39F 5/2 Presentations part II.

40M 5/5 Presentations part III.

**Human Biology final exam will be on May 12, Monday, 9-11 AM in the classroom.**

Exam will be non cumulative. In other words, it focuses chiefly on material since the previous exam, however it will be longer than the normal one-hour exam, and there may be a few very fundamental things that hearken back to earlier in the course that you will remember if you were paying attention.

From the cover of the 11th edition text:

“…His nervous and endocrine systems control the entire body, driving cardiovascular and respiratory function to oxygenate his bulging muscles. The skeleton provides the framework for his precise movements, and the digestive system delivers energy to all the cells and tissues. Eagle-eye vision, hearing and smell sensations create lasting memories in his mind. Together, these cooperating structures enable the delicate balance that is human life.”



 Dude on textbook cover…… Some other dude

 (Professionals models shown don’t try this at home)

**OPTIONAL Blood Donation Extra Credit Assignment.**

Although it would be wonderful if you were able to give blood, I do not want you to feel like you are unduly pressured or forced to do so. Like all medical procedures, there is a small but real chance of side effects, such as bruising, fainting, and even worse things. Again, there is a very small possibility of experiencing side effects, but you should weigh these factors against the benefits as you decide whether or not to participate. Potential donors may have concerns that if a disease like HIV is discovered, that the information could somehow become known without their consent, even though safeguards are in place to prevent this. Visit <http://en.wikipedia.org/wiki/Blood_donation> for more complete information on the risks and benefits of blood donation.

After you have thought it over, please complete one of the following two assignments (I or II). The first way to get the extra credit is to do the alternate assignment below. This could be if you do not wish to donate blood for personal reasons, or cannot for medical reasons. If believe you can give blood and actually go to donate blood and are unable, you will get ½ credit for going, and ½ credit for the assignment 1a below.

I. **Alternate** Extra Credit Assignment (if you cannot give blood)

Write a *2-3-page paper* on *one* of the following topics:

1. I was surprised that I cannot donate my blood for biomedical reasons; here’s the story.
2. Why I do not wish to give blood (if it is for personal or philosophical reasons).
3. How donated blood is processed and used safely.
4. Techniques used to minimize risk of collecting donated blood contaminated with a disease- causing microbe or protein.

II. Blood donation Extra Credit Assignment: Bring this paper with you when you go to donate blood. Give blood and turn in the filled in form to complete the assignment.

 **NSM220 Human Biology** Service Learning Experience

Gordon College Blood Donation Form

 This is to certify that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has
 (student’s name)

 successfully donated one unit of blood (or plasma) to the Red Cross Blood Program on

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 (date)

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (signature of phlebotomist)

*Briefly answer the questions below from the information provided while you wait and your own observations as you donate.*

1. List five conditions for which you *might have been* disqualified from donating blood.
 a.
 b.
 c.
 d.
 e.

2. What tests are done on you to determine if you are a suitable donor?

3. What is done with the blood from your finger prick? Why? What is your hematocrit value?

4. What is the material on the gauze pad used to clean your arm before blood donation? Why is this substance used?

5. Will you donate blood again? Why or why not? Was it harder or easier than you expected?

**Appendix B: Guide to Writing assignments for Moral Issues Reader**

**A. Individual and Group Assignments**

Read the assigned Reader essay and accompanying articles according to the syllabus.

Before coming to an “in-class discussion” class, think about the questions at the end of the reader, then write (using computer, with close attention to spelling and grammar) a complete one to two page response by yourself to the one question assigned to your group. Bring a printout of your response to class, where we will convene in the assigned groups for approximately 15-20 minutes to discuss the various responses members of your group have generated. Hand in your pre-class response to your discussion coordinator at the start of your small group session. In groups, we will try to identify points of commonality and the basis for our disagreements. Take notes on the comments of others in your group. We will then re-convene as a class, and for the rest of the period, one member of each group will present the group's response(s) to the class.

Before the next class, write a second response to your assigned question. First, summarize the contribution of each person in your group (giving credit to each person, by name, for his/her contribution), your group’s response, and further responses from the class and/or instructor. In the second section, re-articulate your position in light of the discussions and your further thinking about the issues raised in your question. At the start of the next regular class, please turn in your final response. (Please do label them: Response 1, Response 2). *Appendix A in the Reader has more hints on the written assignments and student examples.*

**B. Individual grades**

Each student will receive up to 15 points for each reader assignment:

 1. 0-5 points for the "pre-discussion" written response

 2. 0-5 points for attending and participating in the entire small group discussion (Your contribution and participation to small group discussion are diminished if you are late; it is impossible to “make up” what you miss in this component of the work.)

 3. 0-5 points for the "post-discussion" two paragraph-to-page written response

All written responses must be typed. Responses turned in late will be marked down 1 point for each class period late up to the loss of 50% of the credit for the work.

In the event that you cannot attend a group discussion, you may receive partial credit (up to a total of 10 points out of the possible 15 points) for this assignment by writing a one- paragraph response for each of the eight questions in the Reader you missed. These must be and turned in to the instructor no later than the end of the last day of classes immediately preceding final exams.

**C. The Purpose of Moral Issues Reader Assignments**

In our Christian liberal arts education, it is important for students to become better prepared for roles in home, church, and society. Also, through higher education we must develop our critical thinking skills. Finally, we function as a community, and to function well will require that we develop good interpersonal skills. These discussions on Christian perspectives on moral issues in human biology will assist us in integrating our study of biology with our Christian convictions and studies of religion and theology, philosophy, sociology, education, and political science. In the small group format, we will need to think how best to articulate our own viewpoint, share it with several other people, listen and seek to understand each other's viewpoints, analyze and weigh arguments, then re-evaluate and re-articulate our position honestly acknowledging both its strengths and weaknesses. Finally, through the process of careful writing, we hope you will be able to clarify your point of view.