Human Biology - Syllabus

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Lecture:
9:30 am - 10:30 am TR Palmer Hall 206
Lab:
M 1-3 PM Frazier-Jelke Hall 139
3.000 Credits
(Aug 25, 2004 - Dec 15)

REQUIRED TEXTS: Human Biology: Health Homeostasis and the Environment. Daniel Chiras
4th edition

COURSE OBJECTIVES
My objectives for this course are to help you develop:

- A general understanding of human biology.
- An understanding of the process through which scientific knowledge is obtained (the scientific method).
- Critical thinking and problem solving skills.

I hope that, through achievement of these objectives, this course will prepare you to make informed health decisions, understand the biological basis for the development and treatment of certain diseases, and appreciate new discoveries in areas relating to human wellness.

TEACHING GOALS
It is virtually impossible for anyone to remember all the facts, especially when we consider the rate at which our scientific knowledge is increasing. Therefore, my teaching goal is to emphasize understanding of the material rather than memorization of facts. The following strategies will be used to achieve this goal.

- Material for which students voice a particular interest will be included in topic covered in class. In addition, you will be required to choose a focused topic of personal interest to present to the class (see Oral Presentation Guidelines).
- Students are involved class discussion. You are provided homework questions for class discussion. These discussion questions will generally require you to understand the material rather than to regurgitate the facts.
- Students are involved in the evaluation process. For example, you will be involved in writing exam questions, and grading oral presentations and research papers.

CLASS FORMAT

- Prior to each class, you will be given a reading assignment and homework / class discussion questions to answer for the following class.
- You should thoroughly prepare answers to class discussion questions ahead of time by reading the assigned material (and discussing with your peers).
- If your understanding requires clarification, you are encouraged to ask questions in class!
- In class lecture, we will seek to answer the homework questions and to discuss the answers.
- I will frequently collect homework questions to reward you for being prepared.

GRADING

- Two tests 30%
- Final exam 20%
- Homework Questions 10%
- Oral Presentation 10%
- Lab 20%
  (participation and write ups)
- Lab manuscript 10%

TEST FORMAT

- Tests will consist of short answer/discussion questions similar to those provided as homework questions.
- Just as important as taking an exam to further your learning and test your understanding is the process of creating a thoughtful exam question. Exams will be partially or completely comprised of the best and most appropriate questions submitted by students 1 to 2 class periods beforehand. Each student will submit 2-3 questions according to criteria established in advance. Copies of the best student exam questions (but not answers) will be provided for you to use as a study guide.
- A missed exam equals a zero. If you are absent for a medical reason, notify me as soon as possible.

FINAL EXAM

The Final Exam will contain approximately half material covered since the last test and half from material covered during the first three tests. On Monday, Dec. 5, I will give you a list of specific topics for the Final Exam. You will prepare exam questions using these topics, and bring the exam questions to class Wednesday, Dec. 7. During class, we will choose the best questions and open them for class discussion (I will not *give* you the answers). Questions prepared by you\ and your peers will make up the majority of the Final Exam. A study-guide consisting of these and possibly additional questions will be provided ASAP after this class.

HOMEWORK

Homework includes your answers to homework questions (2 points per assignment collected), exam questions you are to prepare for hourly and final exams (2 points per assignment), and participation in the peer evaluation of the lab manuscript and oral presentations (2 points per peer evaluation, this requires class attendance). The total homework grade out of a possible 10 % will be determined by the number of attained points divided by the number of maximum possible points.

FEEDBACK

The primary purpose assigned activities is to help you in your exploration of the human body and to develop written and oral communication skills. Your feedback will help me determine the effectiveness of these activities. I will solicit feedback from you in two ways:

- **CLASS LOG:** I will circulate a notebook during most class meetings. Please feel free to ask specific questions about the material which needs additional clarification, or to provide *constructive* comments about tasks assigned during the semester (i.e., how did they help or hinder your learning?). Your entries may be anonymous or not. I will earnestly try to respond to these questions and comments. During non-class hours, the log book will be kept on a chair outside my office door.

- **QUESTIONNAIRES:** I will give you a questionnaire at mid-semester and again at the end of semester which will ask for feedback on specific aspects of the course. Again, I will earnestly try to be responsive to your feedback.

HOW TO DO WELL IN THIS COURSE

Some additional specifics to do well in this course:

- Be prepared for class (thoroughly prepare answers to class discussion questions, read the assigned material, ask questions to clarify your knowledge of the material).
- Follow the established criteria for creating and answering exam questions.
- Follow guidelines for preparing and evaluating oral presentations and lab manuscripts
- Regular class attendance
- If you bring your enthusiasm, curiosity, and interest to class, you can't help but learn.

WHERE TO FIND COURSE HANDOUTS AND POWER POINTS

Handouts, reading and homework questions provided in class will also be posted in my public folder (in the academic volume). I will also post copies of the syllabus, course calendar, lab handouts, etc. in my public folder. Lecture power points will be posted (in my folder) prior to class. You are encouraged to print these out only if you include 6 slides per sheer (when printing, click on handouts and select 6 slides per page). I will provide you with a CD containing these power points prior to the final exam. Finally, peer oral reports will be posted in the public folder.

GENERAL CLASS POLICIES:

Attendance - I expect you to be present and prepared for each lecture meeting; while I have no formal penalty for missing class, we cover a lot of material and you are responsible for all material covered. Furthermore, there will be test questions drawn from the student presentations, for which you will need to be present. Laboratory attendance is mandatory; each person in a lab group needs to be actively involved in the activities.

Honor Code - I subscribe to the Honor Code at Rhodes College. All work (reports and tests) done for this class is to be pledged.

GUIDE TO ORAL PRESENTATIONS

OBJECTIVE

Giving an oral presentation provides an opportunity for you to explore in detail a topic of interest to you and to improve your ability to communicate your understanding to others. Following finalization of the course calendar, you will be at asked to choose a topic that supplements or relates to major subjects covered in this course. You may wish to talk about current research that offers new insight regarding human biology, or you may present a "mini-lecture" on the specific topic of current interest. You have 10 minutes to give your talk! This means that your talk must be *focused* and to the point. Make sure to practice your talk.

Teaching is the highest form of understanding. -Aristotle

ORGANIZATION: To adequately communicate your topic, you should organize the talk as follows:

A. INTRODUCTION OF YOUR TOPIC

Explain to audience why the topic is of interest and importance to you and those who work in the field.

Explain the key scientific questions to be addressed during the talk.

"MINI-LECTURES"

Explain how your topic fits in with material that we have discussed in class.

Prepare an outline slide on PowerPoint that *briefly* states the main points of your talk.

TALKS ON A CURRENT RESEARCH PUBLICATION

Provide background leading up to your topic by researching past publications of the author (or other authors) that relate directly the current research.

Make sure that the research article you chose is a primary research article (i.e., written by the scientists that did the research. Although you may find about the research via a news article, this is not primary literature. A good web site to find primary research articles is pubmed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi)

B. FOLLOWING THE INTRODUCTION

"MINI-LECTURES"

Thoroughly and logically sequence your points to take the audience from simple general concepts to the more complex and specific.

Use figures to clarify concepts.

Carefully explain each figure in detail sufficient for the audience to understand it.

TALKS ON A CURRENT RESEARCH PUBLICATION

Discuss methods used to test key hypothesis, the results obtained, and the interpretation of the results provided by the author. You will probably want to present data figures in the publication(s) in your PowerPoint presentation. You may wish to agree or disagree with the author's interpretation and provide criticisms or interpretations of your own.

C. SUMMARY AND CONLUSIONS

If you are presenting a topic lecture, conclude with the "take home message" that consists of the fundamental key points you have covered.

For talks on a research publication, summarize key points and conclusions you wish to leave with the audience. These may be the conclusions of the authors you present, or it may even be an opposing conclusion if you choose to disagree with the publication. This is also a good place for some creative speculation on your part about future possibilities regarding your topic.

D. LENGTH OF THE PRESENTATION

10 minutes plus 3 additional minutes for audience questions and discussion. The audience will refrain from during the talk so as not to affect the length of your talk.

E. OTHER HELPFUL TIPS

- Review the peer and self evaluation forms.
- Make sure that your topic is not so broad that you can not adequately cover it in 10 minutes!!!!
- Remember to speak to the audience and not to the screen.
- Speak loud enough for the class to hear.
- Don't assume that the audience knows as much as you do. They don't. You must therefore present the material at an appropriate pace (this can be tricky).
- Start working on the talk well enough in advance that you have time to prepare and practice (i.e., do not start working on this the night before, you will not do a good job).

SUPPLEMENTAL MATERIAL

You should prepare a brief outline that covers the main points of your presentation, to be handed out prior to your talk. Please do not present the outline in such great detail that you end up reading directly from it. If you have a particularly complex illustration in your presentation, you may wish to include it in the handout so that students may take notes on the illustration during your talk. You will also be asked to put your PowerPoint presentation in the class Academic Volume folder so that others may review your presentation at a later time.

EVALUATION

Your peers will evaluate your presentation immediately following the talk on the basis of how well you have achieved the criteria listed above and any other specific criteria agreed upon in class. These written evaluations will include a numerical grade. On the basis of these evaluations you will assign yourself a fair numerical grade for your effort, which is to be submitted to me with written justification, along with all peer evaluations, no later than one week after your presentation. I will judge whether the grade you have given yourself is or is not justified. Examples of peer and self evaluation forms are on the pages that follow.

HUMAN BIOLOGY

Oral Presentation Peer-Evaluation

Name of presenter _____

Title of presentation _____

Evaluator's Soc. Sec. # _____

In the first column, rank yourself with a score from 0 (lowest) to 10 (highest) according to the appropriate criteria. Multiply this rank by the indicated value of each of the criteria and total the final score at the bottom. **Please give feedback** on many if not all of these criteria in the form of written comments at the bottom of the page.

ABILITY OF PRESENTER

Knowledge and understanding of topic (includes ability to answer questions) _____ X 30% = _____

Teaching ability (appropriate level of complexity, appropriate amount of material, ability to make material understood, provides thorough explanation of slides) _____ X 30% = _____

QUALITY OF PRESENTATION

Organization Clear and logical progression of ideas Summary or conclusions _____ X 20% = _____

Quality of slides (concise, visible, relevant, well labeled, not too busy) _____ X 10% = _____

Proper use of time/ Pace _____ X 10% = _____

Total _____

Comments:

HUMAN BIOLOGY

Oral Presentation Self-Evaluation
Name of presenter _____

Title of presentation _____

Soc. Sec. # _____

Look over the student evaluations of your oral presentation, and based on those comments and your own feelings, rank yourself with a score from 0 (lowest) to 10 (highest) according to the appropriate criteria. Multiply this rank by the indicated value of each of the criteria and total the final score at the bottom. **Please justify your own score** with written comments at the bottom or back of the page. Indicate what you feel were the strengths and weaknesses of the talk. Finally, if you could do the talk over again, what would you do the same and what would you do differently. Return this form and all student evaluation forms to me within a week of receiving this form.

ABILITY OF PRESENTER

Knowledge and understanding of topic (includes ability to answer questions) _____ X 30% = _____

Teaching ability (appropriate level of complexity, appropriate amount of material, ability to make material understood, provides thorough explanation of slides) _____ X 30% = _____

QUALITY OF PRESENTATION

Organization _____ X 20% = _____
Clear and logical progression of ideas
Summary or conclusions

Quality of slides _____ X 10% = _____
(concise, visible, relevant, well labeled, not too busy)

Proper use of time/ Pace _____ X 10% = _____

Total _____

Comments:

CRITERIA FOR MAKING AN APPROPRIATE EXAM QUESTION AND ANSWER.

LEVELS OF UNDERSTANDING

1) **knowledge of a fact** (example: an influx of Na^+ ions creates an action potential in a neuron).

2) **understanding of the fact** (to continue the example, voltage sensitive Na^+ion channels open with a depolarization of the membrane, and because Na^+concentration is greater on the outside of the neuron than inside, Na^+ ions flow into the neuron down their chemical gradient, until the influx of Na^+ ions is impeded by the opposite electrical gradient).

3) **application of knowledge** (you should be able to diagram how the neuron membrane potential changes with a depolarizing stimulus).

4) **synthesis of new ideas and models using an integration of 1-3 above** (predict how changes in variables such as Na^+ ion concentration alter an action potential).

At what level of understanding should you be tested? A suitable exam question should incorporate *all* of the above facets. More specifics about an appropriate exam question:

1) It should come primarily from material discussed in class.
2) It should be unambiguous, requiring a precise answer, answerable in a paragraph or less.
3) It should involve a new situation, beginning with detailed conditions and variables you specify, then change the conditions (for example, perform an experiment). The correct answer involves a prediction of how the system responds to the change.
4) Challenge yourself!

What are the key elements to fully answering the question?

1) You must demonstrate that you understand the question.
2) You must have the correct answer.
3) You must present your argument in a logical and precise fashion.

HUMAN BIOLOGY LAB INTRODUCTION

PURPOSE

- Re-enforce your learning from the text and lecture
- Gain experience in communicating the results of your work
- Gain experience in interpreting results and observations
- Gain experience in organizing and contributing to efficient and productive group efforts
- Gain experience in evaluating the ability of others to communicate

One must learn by doing the thing; for though you think you know it, you have no certainty, until you try. - Sophocles

CONDUCT OF THE LABORATORY

- See course calendar for what will occur when.
- Come to lab on time; 2 hours goes by quickly when you're doing experiments, so don't be late.
- Organize into groups of 4 people and assign the tasks that need to be done (surgeon, technician, record keeper, etc.) and rotate responsibilities week after week.
- Data collection- If you do not succeed in obtaining usable data for your lab report, data will be provided by the instructor, other groups, or can be obtained from the literature (but make sure you indicate the source of the data). That is,"getting data" is not an objective of the laboratory!
- Clean up all supplies and turn off all equipment at the end of the Lab.

LAB REPORTS

- You will be required to write 1 formal laboratory report in publication format.
- Submit 3 copies of the lab report one week after the experiment is concluded. Late reports <u>will be penalized</u> one letter grade per day late. (Computer problems - which happen frequently - are no excuse, so do things ahead of time and constantly save your word processing files/data/graphics on floppy disks or in your student volume folder). **Only put your Social Security # on the report, not your name.**
- You will be assigned two lab reports to evaluate on the day after they are handed in along with <u>a peer evaluation form</u> for your comments (these are due at the beginning of the next laboratory period).
- Address the items that should have been included in each section of the report (according to the guidelines on the evaluation form) and indicate whether the material presented is understandable.
- Suggest a grade for each section and for the report as a whole.
- Return the evaluated reports.
- On the basis of the feedback you receive, submit a fair and justified <u>self-evaluation</u> of your effort and achievement within a week of receiving such feedback. Also turn in your two peer evaluations with your self-evaluation. The professor will determine the fairness of your peer evaluations as well as your self-evaluation.
- You will be given a handout contains instructions on how to prepare lab reports.

LAB WRITE-UPS AND ANSWERS TO QUESTION

For a majority of the experiments this semester, you will turn in a write-up of your results and answers to questions that you should consider during the course of the experiment. Specific instructions regarding the appropriate format for the write-up of results and specific questions you are to answer will be provided in the lab handout for that week. These write-ups and answers are due the following week, and each count for 2% of your total course grade.

OTHER LAB POLICIES

- Caution when handling pharmaceuticals - many of our lab experiments will utilize drugs that can be quite toxic (I'll let you know which ones when the time arises). You should wear gloves when handling these compounds and exercise extreme caution.
- Food and drink are allowed in lab (a four hour lab can sometimes reduce one's glucose levels!). However, consumables are not to come anywhere near the computer, pharmaceuticals, or experimental setups.
- You have 24 hour access to the lab (at times you'll need it!). The lab door combination is 1 and 5 pressed simultaneously, then 3. Please keep the lab in order even during non-scheduled lab times. Lock the door if you're the last person to leave.
- Use of the computers is allowed at any time but should be limited to biology related work (email is ok too). Please don't use the lab printer for other coursework, and do not share the computer passwords with other students.
- Help yourself to the library of texts and references within the lab, but the books aren't for checking out. You may take them out of the lab for photocopying for up to 30 minutes, but use the sign out sheet when you do.

THE USE OF ANIMALS IN LABORATORY EXPERIMENTS

As stated in the Rhodes catalog, please note that the laboratory exercises in this class require the use of live animals or animal tissues. Certain key objectives of the course cannot be accomplished without experimental surgery. We will adhere to Federal guidelines for animal care and use, and insist upon humane treatment of animals at all times. As you handle the animals, please have regard for their well being as well as the sensitivities of those around you. If you have a problem with using live animals in research for religious, ethical, or personal reasons, please see me immediately. This course may not be appropriate for you. This sensitive issue must be addressed by all concerned parties.