BIO 552-900     MAMMALIAN PHYSIOLOGY I     Fall 2016

Instructor: Mark Thomas     Online Course: administered via CANVAS program
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Office Hours: By appointment (schedule via CANVAS discussion board)

Textbook: Medical Physiology, Boron & Boulpaep (1st or 2nd Edition)

Course Description: Advanced systemic physiology of mammals, with an emphasis on humans. Essential and advanced topics in systemic physiology, focusing on homeostatic systems. The course will begin with an overview of the essential principles of systemic physiology, including homeostasis and feedback control systems. We will then discuss: cardiovascular, respiratory, renal, and digestive physiology and whole-body metabolism. It is assumed that students have a solid background in cell physiology, biochemistry, and fundamentals of physics. There are no formal prerequisite courses.

LMS: I will use the online program, CANVAS, to organize the course. The course is organized into 5 modules, containing learning objectives, lectures, quizzes, and other relevant materials. In addition to reliable web access, you will need a computer with a web camera for exam proctoring (see below).

Technical issues: We will have a graduate student teaching assistant for the on-line course. Their role will be to handle any technical difficulties that may occur during the course; I will provide their contact information when I receive it. Please direct all questions related to technical problems to the TA.

Lecture Format: PowerPoint lectures (posted on CANVAS) delivered in the classroom version of this course will be videotaped and uploaded into CANVAS directly following the scheduled lecture (the lecture schedule is posted on CANVAS). Review of the material in these lectures will be prerequisite for the scheduled quizzes posted weekly on CANVAS (see below).

Assessment: (1) Unit exams: There will be four exams covering materials from a module / unit. The format for test questions will be multiple choice / matching / fill in the blanks. (2) Comprehensive final exam: covers entire course; opportunity to integrate course concepts. The format for the final exam will be similar to the Unit exams. The unit exams and final will be proctored using an on-line service, ProctorU. (3) Quizzes: Posted at the end of the week on CANVAS; quizzes (5 questions, 10 pts total) will cover material from lectures delivered that week. 17 quizzes will be deployed during the course; I will drop your lowest 2 quiz scores. (4) Case studies / Paper evaluations: At the end of modules 2 through 5, I will assign either a case study or a research paper covering concepts addressed in that module. Students will work in groups (2-4 students per group) to analyze the case study or evaluate the paper, using an on-line discussion board. (5) Discussion participation: Several lecture periods will be devoted to class discussion of relevant topics. Each student must contribute to the discussion by posting comments, using the on-line discussion board. At least 5 opportunities for discussion will be scheduled (see lecture schedule posted on CANVAS). Due dates will be posted for each of the above assignments. NO CREDIT will be given for assignments completed after the due date.

GRADE EVALUATION:

<table>
<thead>
<tr>
<th>Grading Summary</th>
<th>Points</th>
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<tbody>
<tr>
<td>4 Unit exams @ 50 points ea</td>
<td>200</td>
</tr>
<tr>
<td>Comp. Final exam @ 50 points</td>
<td>50</td>
</tr>
<tr>
<td>15 quizzes @ 10 pts ea</td>
<td>150</td>
</tr>
<tr>
<td>4 Case Studies / papers @ 25 pts ea</td>
<td>100</td>
</tr>
<tr>
<td>5 Discussion participation @ 10 pts ea</td>
<td>50</td>
</tr>
<tr>
<td>Total Points</td>
<td>550</td>
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Grading Scale: Course Points

A 100 – 90 % 550 – 495
B 89 – 80 % 494 – 440
C 79 – 70 % 439 – 385
D 69 – 60 % 384 – 330
F 59 – 0 % 329 – 0

I reserve the right to curve the grades as necessary at the end of semester, to achieve a reasonable overall GPA.
Academic Dishonesty: All material for this course must be your, and only your, work. If you are caught cheating, you will receive an F grade for the class, and the incident will be reported to the Dean's Office.

Students with disabilities: Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact Disability Support Services at (970) 351-2289 to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner.

Topic Outline with text references BIO 552 Fall 2016

1. Module 1: Homeostasis & feedback control systems (Chapter 1; NOTE: you should review chapters 3 & 5)

2. Module 2: Cardiovascular physiology

Overview of CV function (Chapter 17)
Cardiac electrophysiology (Chapter 21)
Heart as a pump: cardiac cycle & E-C coupling (Chapter 22)
Hemodynamics & peripheral circulation (Chapters 17 & 19)
Microcirculation: capillary exchange & local control (Chapter 20)
Short-term control of arterial pressure & cardiac output (Chapter 23)
Special Circulations (Chapter 24) & Cardiovascular Pathology (interspersed)

3. Module 3: Respiratory physiology

Overview of respiratory function (Chapter 26)
Mechanics of ventilation (Chapter 27)
Acid-base physiology (Chapter 28)
Gas transport in the blood (Chapter 29)
Gas exchange (Chapter 30)
Pulmonary Ventilation & Perfusion (Chapter 31)
Control of ventilation (Chapter 32)
Pulmonary Pathology (interspersed)

4. Module 4: Renal physiology

Overview of renal function (Chapter 33)
Glomerular filtration (Chapter 34)
Tubular transport of electrolytes & organic solutes (Chapters 35 - 37)
Water balance: concentration & dilution of urine (Chapter 38)
Acid-base regulation by the kidney (Chapter 39)
Integration of salt & water balance (Chapter 40)
Renal Pathology

5. Module 5: Gastrointestinal and Metabolic physiology

Overview of GI system (Chapter 41)
Gastric Function (Chapter 42)
Pancreatic & Salivary Glands (Chapter 43)
Nutrient & electrolyte absorption (Chapters 44 & 45)
Hepatobiliary function (Chapter 46)
GI / Hepatic Pathology
Metabolism & energy balance (Chapter 58)
Regulation of metabolism: the endocrine pancreas (Chapter 51)
Regulation of body temperature (Chapter 59)
Metabolic Pathology (interspersed)