Principles of Medical Physiology
Course Syllabus

Course Number:  GMS 6400C
Credit Hours:  6 credit hours
Course Format:  This online course is tailored for asynchronous distance learners.

COURSE DESCRIPTION
Principles of Medical Physiology (GMS6400C) teaches the functions of the human body at a level required for clinical medicine. The course covers normal physiology, as well as selected diseases. Concepts are organized by systems: Endocrine, Cardiovascular, Respiratory, Renal and Gastrointestinal. Additional content includes a Foundational Basics introductory section on the cell, body fluids and autonomic nervous system and a final Integration section which applies the physiological principles learned to special situations (Pregnancy, Aging, Exercise, Stress). The ultimate goal is for students to develop an understanding of the integrated functions of the normal body and “problem solving” and “critical thinking” skills in evaluating clinical situations. Each recorded lecture lasts ~20 – 30 min.

TARGET AUDIENCE
This course is designed to meet the needs of individuals wanting to pursue a career in medicine or biomedical research. This course will provide a foundation for students who have not met the entry requirements for medical school and for those wishing to enhance their applications into Masters and PhD programs in the medical sciences.

PREREQUISITES
This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

CONTACTS
Bruce R. Stevens PhD, Professor of Physiology and Functional Genomics, stevensb@ufl.edu; Tel: 352-392-4480. Chris Baylis PhD, Professor of Physiology and Functional Genomics, baylisc@ufl.edu; Tel 352 392 7869.

SCHEDULE
This is a 15 week course that is offered in the spring, fall and summer.

COURSE GOALS
Physiology is the science of how the body functions, and is the basis for understanding modern clinical medicine and the biomedical sciences. This course will provide: 1) a foundation understanding of the basic functions of the human body; 2) knowledge of the physiology of the major systems: endocrine, cardiovascular, muscle, respiratory, renal, and gastrointestinal, as well as selected diseases that affect these systems; 3) integration of these individual facts in order to understand how organ systems work independently and interdependently in the body. One example of this integration is in the control of acid base balance. Other examples covered in this course are in the integrated responses to pregnancy and exercise as well as pathophysiologic responses to aging.

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LEARNING OUTCOMES
Upon completion of this course, students will be able to:

1. Understand the normal functions of the individual body systems at a level required for an understanding of clinical medicine.
2. Understand how these systems act in an integrated manner to regulate overall body functions.
3. Understand how failure of these normal physiologic functions and integrations are associated with some diseases.
4. Demonstrate the ability to apply physiological principles of clinical relevancy by multiple choice examinations and Quiz exercises.

LEARNING RESOURCES
1. Recorded video lectures with PowerPoint presentations will be provided on the course website.
2. Recorded video clinical correlation(s) and/or case studies relating to the basic science material.
3. Lecture notes for each video lecture are available as PDF downloads enabled for direct note taking.
5. Practice on-line quizzes (not for grade) to advance the understanding of the material provided in lectures.
6. Example exam questions (not for grade) to test knowledge and prepare for each examination.

INTERACTIVE COMMUNICATIONS WITH FACULTY
If a student is unclear regarding parts of a topic, the Discussion Forum is the place to post a question. During the Discussion window of time for each Block of content (see Figure below), students can interact with faculty regarding the material through the Discussion Forums. The Discussion Forums are also a place for students to ask and answer questions among each other. Be sure to check back once the question is posted to see the answer from the faculty members or fellow classmates.

STRUCTURE OF CONTENT
The course content is structured into Blocks. The six Blocks are: Foundational Basics+Endocrine Part 1; Endocrine Part 2; Cardiovascular+Muscle; Respiratory; Renal; and Gastrointestinal+Integrated Physiology. The content of the Blocks is shown later in this syllabus.

COURSE CALENDAR and RECOMMENDED TIME MANAGEMENT
The calendar of all course event is shown in the following Figure. The videos and corresponding PDF notes are available throughout the entire time the course is open, from the first day through the end of the course on the day the grades are reported to the Registrar. However, each Exam is open ONLY during the windows of time shown on the website and denoted in the Figure below. For each Block the course content lecture titles should be viewed in the order shown later in this syllabus. For Block 1 and Block 6 in particular, note in the following Figure our recommended calendar dates for breakdown of when to view the videos and PDFs of the content in those Blocks—as a guide to help in managing time, students may use these recommendations or may alternatively adapt your own learning pace, as long as the student is prepared to take the Exam during the allotted time window.
EXAMINATIONS AND GRADING
There will be 6 multiple choice examinations, each covering the contents of a Block. Exam 1 covers Foundational Basics+Endocrine Part 1; Exam 2 covers Endocrine Part 2; Exam 3 covers Cardiovascular + Muscle, Exam 4 covers Respiratory, Exam 5 covers Renal, and Exam 6 covers Gastrointestinal + Integrated Physiology. All exams will be monitored by ProctorU, a UF chosen service that allows the students to complete their exams at home while still ensuring academic integrity. Students will take all examinations at a computer that meets the technical requirements of ProctorU including a web cam and microphone. Students will make the arrangements for exam proctoring. **We recommend you make an appointment with ProctorU at least two weeks in advance of each exam date.** All costs of these exams are covered in the registration costs. You will receive your individual exam grades within 24h after the last day of the window of time when the exams are open. Scores are reported as a percent. The points used to compute final grades will be determined after all exams have been completed. The final grade is based simply on the overall percentage of points covering all 6 Exams; in other words the contribution of each Exam to the final percentage is weighted according to the number of questions on each Exam. The final letter grade for the entire course will be issued within 72h after exam #6 has been completed.

Grading scale:

A final numerical score for the entire course will be computed at the end of the semester for each student. After dropping his/her single lowest exam, the points will then be computed based on the five remaining exam scores. The faculty may also factor in other considerations in adjusting scores to a possibly higher score. A final letter grade will be assigned as follows, per University of Florida standards:

- 93-100% = A
- 90-92% = A-
- 87-89% = B+
- 83-86% = B
- 80-82% = B-
- 77-79% = C+
- 73-76% = C
- 70-72% = C-
- 67-69% = D+
- 63-66% = D
- <63% = E

GRADING POLICY
There are no make-up exams unless otherwise granted by the course coordinator prior to an examination date. Failure to take an exam without prior permission from the course coordinator will be recorded as 0.

ACADEMIC HONESTY
Please review the complete policy of the University of Florida regarding academic dishonesty, found in the online student handbook at: [http://graduateschool.ufl.edu/student-life-and-support/student-handbook](http://graduateschool.ufl.edu/student-life-and-support/student-handbook)

Students are expected to abide by the University of Florida Academic Honesty Guidelines and to adhere to the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."
BLOCK 1

PHYSIOLOGY FOUNDATIONAL BASICS
Section Coordinator Bruce Stevens, Ph.D. (stevensb@ufl.edu)

  Introduction to Foundational Basics Section Stevens
  Transporters, Pumps, and Channels – Part I Stevens
  Transporters, Pumps, and Channels – Part II Stevens
  Physiology of Voltage & Concentration Gradients – Part I Stevens
  Physiology of Voltage & Concentration Gradients – Part II Stevens
  Body Fluids I Baylis
  Body Fluids II Baylis
  Receptors and Signaling – Part I Sumners
  Receptors and Signaling – Part II Sumners
  Autonomic Nervous System – Part I Scheuer
  Autonomic Nervous System – Part II Scheuer
  Autonomic Nervous System – Part III Scheuer

ENDOCRINE Part 1
Section Coordinator Kirk Conrad M.D. (kpconrad@ufl.edu)

  Introduction to the Endocrine Section Conrad
  Introduction to Endocrinology Physiology Sumners
  Hypothalamus and Pituitary – Part I Sumners
  Hypothalamus and Pituitary – Part II Sumners
  Adrenal Medulla – Part I Sumners
  Adrenal Medulla – Part II Sumners
  Adrenal Cortex – Part I Wood
  Adrenal Cortex – Part II Wood
  Thyroid Hormones – Part I Sumners
  Thyroid Hormones – Part II Sumners
  Clinical Correlation: Thyroid – Part I Winter
  Clinical Correlation: Thyroid – Part II Winter
  Quiz covering Foundational Basics plus Endocrine Part 1 Faculty

* Block 1 Multiple Choice Exam #1 on Foundational Basics + Endocrine Part 1
Calcium/Phosphate Regulation - Part I  Sumners
Calcium/Phosphate Regulation – Part II  Sumners
Calcium/Phosphate Regulation – Part III  Sumners
Calcium Phosphate Regulation – Par IV  Sumners
Fluid Balance & Cardiovascular Control  Sumners
Growth Hormone – Part I  Raizada
Growth Hormone – Part II  Raizada
Blood Glucose Regulation – Part I  Raizada
Blood Glucose Regulation – Part II  Raizada
Blood Glucose Regulation – Part III  Raizada
Reproduction (Sexual Differentiation – Part I)  Conrad
Reproduction (Sexual Differentiation - Part II)  Conrad
Reproduction Male – Part I  Conrad
Reproduction Male – Part II  Conrad
Reproduction Female – Part I  Conrad
Reproduction Female – Part II  Conrad
Reproduction Female – Part III  Conrad
Reproduction Female – Part IV  Conrad
Reproduction Pregnancy – Part I  Conrad
Reproduction Pregnancy – Part II  Conrad
Reproduction Pregnancy – Part III  Conrad
Reproduction Pregnancy – Part IV  Conrad
Special Topic: Carbohydrate Metabolism in Pregnancy  Conrad
Clinical Correlation : Assisted Reproductive Technologies – Part I  Rhoton
Clinical Correlation: Assisted Reproductive Technologies – Part II  Rhoton
Quiz  Faculty

* Block 2 Multiple Choice Exam #2 on Endocrine Part 2
**BLOCK 3**

**MUSCLE and CARDIOVASCULAR**
Section Coordinator Judy Delp Ph.D., (jdelp@ufl.edu)

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<td>The Molecular Structure of Muscle</td>
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<td>Muscle Function and Regulation – Activation</td>
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<td>Muscle Function and Regulation – Force Modulation Part I</td>
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<td>Cardiac Ion Channels – Part I</td>
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<td>Hemodynamics, Arteries – Part I</td>
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<td>Neural Control – Part I</td>
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<td>Local control of flow</td>
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<td>Microcirculation – Part I</td>
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* Block 3 Multiple Choice Exam #3 on Muscle and Cardiovascular
**RESPIRATORY PHYSIOLOGY**
Section Coordinator: Peter P. Sayeski, Ph.D. ([psayeski@ufl.edu](mailto:psayeski@ufl.edu))

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<td>Introduction and Functional Anatomy</td>
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<td><strong>Clinical Correlation: Case Studies Part II</strong></td>
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* Block 4 Multiple Choice Exam #4 on Respiratory Physiology*
Introduction to Renal Physiology Section
General Functions of the Kidney. Renal Anatomy
Clearance- Part I
Clearance Part II
Renal Hemodynamics – Part I
Renal Hemodynamics – Part II
Renal Hemodynamics – Part III
Renal Hemodynamics – Part IV
Renal epithelial sodium transport
Control of sodium balance – Part I
Control of sodium balance – Part II
Control of sodium balance – Part III
Control of sodium balance – Part IV

Quiz 1
Renal handling of Calcium and Phosphate
Renal handling of Potassium
Concentration and Dilution – Part I
Concentration and Dilution – Part II
Concentration and Dilution – Part III
Concentration and Dilution – Part IV
Acid/Base Balance – Part I
Acid/Base Balance – Part II
Acid/Base Balance – Part III

Quiz 2

* Block 5 Multiple choice Exam #5 on Renal Physiology
**BLOCK 6**

**GASTROINTESTINAL**
Section coordinator Bruce Stevens Ph.D. (stevensb@ufl.edu)

- Introduction to Gastrointestinal Physiology Section
- Gastrointestinal Nervous System & Motility Part I
- Gastrointestinal Nervous System & Motility Part II
- Gastrointestinal Nervous System & Motility Part III
- Gastrointestinal Nervous System & Motility Part IV
- Phases of Digestion and Salivary Gland Physiology
- Exocrine Pancreas
- Gastric Physiology Part I
- Gastric Physiology Part II
- Small Intestine Epithelium and Protein Digestion/Absorption
- Carbohydrate Digestion/Absorption
- Liver and Gallbladder Part I
- Liver and Gallbladder Part II
- Lipid Digestion and Absorption Part I
- Lipid Digestion and Absorption Part II
- GI Electrolytes and Fluids Part I
- GI Electrolytes and Fluids Part II
- Summary map of digestion and absorption
- Study guides: GI hormones and GI regulators
- Gastrointestinal Commensal Microbiota – Part I
- Gastrointestinal Commensal Microbiota – Part II
- Quiz

**INTEGRATED PHYSIOLOGY**
Section Coordinator Chris Baylis Ph.D. (baylisc@ufl.edu)

- Introduction to Integrated Physiology Section
- Pregnancy Physiology: Maternal – Part I
- Pregnancy Physiology: Maternal – Part II
- Pregnancy Physiology: View from the Fetus
- Aging Physiology: Kidney
- Aging Physiology: Cardiovascular
- Integration: Muscle and the cardiovascular system
- Exercise Physiology and Cardiovascular – Part I
- Exercise Physiology and Cardiovascular – Part II
- Exercise Physiology and Lungs
- Stress
- Quiz

*Block 6 Multiple choice Exam #6 on Gastrointestinal + Integrated Physiology*