

APPLICATION FOR NEW COURSE

1. Submitted by College of Medicine Date November 15, 2002
Department/Division offering course Physiology

2. Proposed designation and Bulletin description of this course

a. Prefix and Number PGY 611 b. Title* Advanced Medical Physiology
*NOTE: If the title is longer than 24 characters (including spaces), write
A sensible title (not exceeding 24 characters) for use on transcripts Medical Physiology

c. Lecture/Discussion hours per week 15 – 9 weeks d. Laboratory hours per week _____

e. Studio hours per week _____ f. Credits 6

g. Course description
A comprehensive physiology course examining the systems, cellular and molecular basis of clinical physiology

h. Prerequisites (if any)
Second year graduate standing and completion of IBS 606

i. May be repeated to a maximum of _____ (if applicable)

4. To be cross-listed as
_____ Prefix and Number _____ Signature, Chairman, cross-listing department

5. Effective Date Spring, 2003 (semester and year)

6. Course to be offered Fall Spring X Summer

7. Will the course be offered each year? X Yes No
(Explain if not annually)

8. Why is this course needed?
Physiology graduate students are likely to teach medical physiology. This course provides them with the clinical ramifications of physiology

9. a. By whom will the course be taught? Team taught by Physiology faculty
b. Are facilities for teaching the course now available? X Yes No
If not, what plans have been made for providing them?

Students will attend Human Function lectures (PGY 818) then discussion sessions with physiology faculty

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10. What enrollment may be reasonably anticipated? 3-7 Physiology graduate students
11. Will this course serve students in the Department primarily? Yes No
Will it be of service to a significant number of students outside the Department? Yes No
If so, explain.
-
- Will the course serve as a University Studies Program course? Yes No
- If yes, under what Area? _____
12. Check the category most applicable to this course
- traditional; offered in corresponding departments elsewhere;
- relatively new, now being widely established
- not yet to be found in many (or any) other universities
13. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky? Yes No
14. Is this course part of a proposed new program: Yes No
If yes, which?
-
15. Will adding this course change the degree requirements in one or more programs? * Yes No
If yes, explain the change(s) below
-
16. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.
17. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.
18. Within the Department, who should be contacted for further information about the proposed course?
- Name Timothy McClintock Phone Extension 3-1083

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.

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Signatures of Approval:

_____	Department Chair	_____	Date
_____	Dean of the College	_____	Date
		_____	Date of Notice to the Faculty
_____	*Undergraduate Council	_____	Date
_____	*University Studies	_____	Date
_____	*Graduate Council	_____	Date
_____	*Academic Council for the Medical Center	_____	Date
_____	*Senate Council (Chair)	_____	Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

16 Further description of PGY611:

This class is designed to provide our physiology graduate students with in-depth training in physiological systems in a clinically relevant context. It will also provide them with the unique experience of interacting with medical and dental students in a medical level physiology course. The information contained in this course and the work expectations are well beyond the PGY 502 Graduate Physiology course which we teach for other programs. With the change to the Integrated Biomedical Science Program, our students have only an introduction to physiological principles in IBS 606. They require a more intensive physiology survey course and we believe that the best opportunity for them is to participate in the in-depth Human Function course which we teach in May and June for the medical and dental students. This class meets for about 3 hours a day. The practical advantages for our students include an introduction to the unique training and clinical applications/correlations that are part of a medical physiology class.

Because of the timing of this course which is dictated by the medical and dental school curricula, we propose that the students register for this course in the spring semester of their second year with grades being assigned as soon as the course is completed. This course typically begins during finals week and it is expected that they will register for some additional courses during the spring semester. In addition to the fact that graduate students cannot register for a professional course, this new course will allow us to require two additional things from the graduate students. First, the graduate students will be expected to participate in all aspects of the medical class, plus they will have an extra discussion session each week to clarify their comprehension of basic principles. Second, evaluation of the graduate students will include all of the quizzes and exams, plus an additional essay exam. This exam will allow assessment of the ability of the graduate students to synthesize the material in the course and use it to solve problems.

A course description for the upcoming year graduate level class and a class schedule from the previous year are attached.

Advanced Medical Physiology 2003 (PGY 611)
May 5 - July 3, 8:30 AM - 11:50 AM Monday through Friday HSLC 201

Course Objectives:

The objectives of Human Function are to enable physiology graduate students to:

- 1. Obtain a working knowledge of human physiology**
- 2. Apply that knowledge to derive solutions to problems related to human health and disease.**
- 3. Participate in a medical physiology class and understand the special clinical relevance that is necessary.**

Physiology

Physiology is an integrative science that requires students to learn basic facts and then use those facts to understand the function of complex, interacting systems. This discipline is essential to the practice of both medicine and dentistry. Because of the complexity and interactive nature of this subject, **students must realize that there is often no single solution.** In this regard, students must begin to think as professionals and realize that a problem may have several solutions and they must consider all options before deciding which solution is best. For example, high blood pressure can be treated by decreasing either cardiac output or vascular resistance. Each of these parameters can be affected by multiple factors (which, in turn, are affected by multiple factors, ...). The task of the physician, dentist, or physiology student is to understand the basic principles, consider all of the facts, and then select the best method of treatment.

Course Texts:

There are many good monographs and textbooks appropriate for a medical physiology course. The following are recommended as some of the best texts available, however alternative reading assignments may be useful to some students. The required texts are listed below in the order in which they will be used in the course.

Endocrine Physiology, 2nd edition, 2001

Susan P. Porterfield
Mosby, Inc.
0-323-01128-4
\$29.99

*these
three books are available in the medical
bookstore

Gastrointestinal Physiology, 6th edition, 2001

Leonard Johnson
Mosby, Inc.
0-323-01239-6
\$29.95

Human Physiology: The Mechanisms of Body Function, 7th edition 1998

Muscle, Ch 11 and Regulation of Body temperature, pp 625-634
Arthur Vander, James Sherman and Dorothy Luciano
McGraw-Hill
customized Vander product ISBN#: 0-07-235703-7 , \$9.50
Cardiopulmonary System, 1st edition, 1998
Daniel Richardson, David Randall and Dexter Speck

Fence Creek Publishing
1-889325-30-9
\$24.95

*these books are currently out of print, however there are several copies on reserve in the library and they can be purchased on-line (bestbookbuys.com & campusbooks.com)

Renal System, 1st edition, 1999
Brian A. Jackson and Cobern E. Ott
Fence Creek Publishing
1-889325-31-7
\$24.95

Faculty:

This is a team taught course. The faculty with major instructional input in this course are given below. In addition, several clinical faculty will participate in case presentations and discussions of clinical applications of physiology.

Instructor/office/phone/e-mail

E-mail: dfspeck@uky.edu
MS 515; 323-5383

Dr. Brian Jackson
E-mail: jackson@uky.edu
MS 581; 323-5217

Dr. Lu-Yuan Lee

Dr. Sandra Legan
E-mail: sjlegan@uky.edu
425 HSRB; 323-6277

Dr. Dexter Speck, Course Director
Dr. Cobern Ott
E-mail: cott@uky.edu
MN 512; 323-5348

Dr. David Randall
E-mail: randall@uky.edu
MN 526; 323-6041

Dr. Daniel Richardson
E-mail: lylee@uky.edu
E-mail: dirichar@uky.edu
MS 511A; 323-6339 MN
510; 323-5649

Feedback and Consultation:

Instructors will be available for student consultations during the time their material is being presented. The most effective procedure for arranging a consultation is for students to contact an instructor after class or by phone to set up an appointment. The course director will be available for consultation during the entire 9 week period. In addition, the course director will hold regularly scheduled meetings with a group of class representatives (the Human Function liaison group) to field complaints and discuss suggestions for improving the course. **All students are encouraged to consult the Course Director with any problems or concerns.**

Instructional Methods:

The instructional methods and procedures used in Human Function will include didactic lectures in which students take notes, Socratic discussions based on question/answer dialogue

between instructor and students, demonstrations, laboratories and computer assisted learning.

Student Responsibilities and Expectations:

In order to achieve the course objectives the students will be expected to:

(1) Attend class on a regular basis.

Regular class attendance is essential for obtaining and applying knowledge. The didactic lectures where most of the basic knowledge is presented will amplify and add to material presented in the text, rather than simply regurgitate text information. Accordingly, it will be very difficult for a student to obtain an A or a B in this course by simply reading the text.

(2) Be active learners

From a cognitive view, active learning is the process of building mental models (Modell and Michael, NY Acad. Sci. 701, 1, 1993). From an operational view, active learning is any activity whereby students become directly involved in their own education and, in part, a source of their own learning (Richardson, Adv. Physiol. Educ. 10: S79, 1993). Note that by this definition active learning is not any particular educational method or procedure. The long range objective of active learning, as applied in Human Function, is to foster habits of life long learning.

Examples of active learning include, but are not limited to:

- a) Reading class assignments and reviewing lecture handouts prior to class
- b) Readily participating in class discussions.
- c) Asking questions during lecture presentations. This is **highly encouraged**.
- d) Studying relevant material not assigned (e.g., from web site links).
- e) Asking questions of the instructors outside of class.

(3) Participate in a weekly discussion session on Thursday afternoon with the instructor.

This time is an opportunity for the students to increase their understanding through a close mentorship with the physiology faculty. Important physiological principles and concepts will be discussed and reinforced.

Student Evaluation (grades):

There will be two types of performance evaluation used for the purpose of grade assignment:

1) objective examinations; and 2) subjective and objective quizzes.

Quizzes: There will be a variety of short quizzes given throughout the course, collectively totaling 80 points (see class schedule for dates). Each quiz will be given in conjunction with other activities of the day. Note that in the endocrinology section there will be a total of 7 quizzes each worth 5 points. However, only the top four (4) quizzes for each student will count (20 points total) towards that student's grade.

Examinations: There will be three major multiple choice examinations evenly spaced in the schedule along with a final essay examination. This final written essay-style examination will permit the graduate students to demonstrate their deeper understanding of physiological principles. The multiple choice examinations will require the student to select the **single best answer**. Because of the integrative nature of physiology, it is often possible to logically argue that several answers to a given question are correct if we allow enough assumptions. All of the instructors attempt to minimize confusion in their questions so that there is a single legitimate best answer. Occasionally a question is thrown out or multiple answers are accepted if the question is deemed to be unfair after reviewing both the analysis of test question performance and student feedback.

The exact number of questions may vary from exam to exam, but all four examinations will be equally weighted by expressing the grades as a percentage of correct responses for each student. Note that each examination will be preceded by a study day in which there will be an optional question and answer (Q&A) session, but no formal class. By this time the exact number of questions for a given exam will be known, and this information will be made available at the Q&A session, and posted on the course web site.

CAUTION!! *Physiology by its nature is an integrative discipline. As such, material covered in the context of one examination may appear again in subsequent exams. Answers to multiple choice questions in physiology (and in the practice of medicine) often depend upon conceptual knowledge and the integration of multiple bits of information.*

Feedback: As noted in the schedule, the examination periods will be from 8:30 until 11:00. At 11:00 the examination, including answers, will be reviewed by the course director in HSLC 201 for all students. The purpose of this session is twofold: 1) Most importantly, it is an effective learning tool that gives the student the opportunity to hear the rationale behind the best answer and helps the student conceptualize the knowledge, 2) It gives the students an opportunity to ask why some answers are not the best and to explain their reasoning. Instructors will consider those arguments and respond to them as appropriate. No answers will be changed during this review session, however some answers may be deemed acceptable after complete analysis of the test questions. Subsequent inquiries will be dealt with on a case by case basis between students and individual instructors and/or the course director.

Determination of final grades: The three major multiple course examinations and the final essay exam will collectively be worth 85% of the final grade, and the quizzes will be worth the remaining 15%. Accordingly, a student's overall course score will be determined as follows:

Course Score = Average exam score (in %) X 0.85 + quiz score (#points/80 X 100) X 0.15

Example: a student who obtains an examination average of 78% and scores a collective total of 74 points in quizzes (92.5%) will have a final course score of 80.2% ($78 \times 0.85 + 92.5 \times 0.15$). Course scores, determined from the above formula, will be converted to a letter grade as follows:

90% or more = A
80 through 89% = B
70 through 79% = C
Less than 69% = E

Note: Borders between grades will occupy a range that takes into consideration factors such as the pooled standard error of measurement of the exams. These factors will not be known until the end of the course when all exam and quiz scores are compiled.

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A course description for the upcoming year graduate level class and a class schedule from the previous year are attached.

**HUMAN FUNCTION (PGY 818; OBI 814)
2002**

Class Schedule

Unless otherwise stated, Human Function will meet Monday through Friday beginning at 8:30 AM in room HSLC 201, and ending no later than 11:50 AM. The following schedule gives topics and activities for each day. The times noted for each topic or activity are the approximate times when the topic or activity will begin. Appropriate break periods will be given between the end of one topic and the beginning of the next. *Page assignments and other reference information will be given by the individual instructors. Changes will be posted on BLACKBOARD as announcements.*

DATE	TIME	TOPIC	INSTRUCTOR
April 29	8:30	Introduction to the course	Speck
	10:00	General Endocrinology & Neuroendocrinology	Legan
April 30	8:30	Class discussion on topic of April 29	Legan
	9:15	**Quiz on topic of April 29 (5 pts)	Legan
	9:45	The Thyroid Gland & Growth Hormone	Legan
	11:00	Patient presentation	Assael
** The top 4 of each student's endocrinology quizzes will count towards the grade			
May 1	8:30	Class discussion on topic of April 30	Legan
	9:15	**Quiz on topic of April 30 (5 pts)	Legan
	9:45	Hormonal Control of Intermediary Metabolism	Legan
	11:00	Patient presentation	Ain
May 2	8:30	Class discussion on topic of May 1	Legan
	9:15	**Quiz on topic of May 1 (5 pts)	Legan
	9:45	Hormonal Control of Extracellular Calcium	Legan
	11:00	Patient presentation	Karounos
May 3	8:30	Class discussion on topic of May 2	Legan
	9:15	**Quiz on topic of May 2 (5 pts)	Legan
	9:45	Structure of the GI system and smooth muscle	Speck
	11:00	Patient presentation	Reynolds
May 6	8:30	GI motility I	Speck
		Video and discussion of smooth muscle lab	Speck
		Clinical Correlation: Dysphagia	Speck
		GI motility II	Speck
May 7	8:30	Basic principles of GI secretions	Speck
		Clinical case: peptic ulcers	Speck
		Pancreatic and intestinal secretions	Speck
DATE	TIME	TOPIC	INSTRUCTOR
May 8	8:30	Quiz on motility and secretions (10 pts)	Speck
	9:00	Liver secretions	Speck
		Clinical Case: Cystic fibrosis	Speck
May 9	8:30	Basic principles of digestion and absorption	Speck
		Carbohydrate digestion	Speck
		Protein digestion	Speck
May 10	8:30	Fat and water absorption	Speck
		Integrated response to a meal	Speck
		11:00	The Adrenal Gland

May 13	8:30	Class discussion on topic of May 10	Legan
	9:15	**Quiz on the Adrenal Gland (5 pts)	Legan
	9:45	Male Reproduction	Legan
	11:00	Patient Presentation	Miller
May 14	8:30	Class discussion on topic of May 13	Legan
	9:15	**Quiz on topic of May 13 (5 pts)	Legan
	9:45	Female Reproduction I	Legan
May 15	8:30	Class discussion on topic of May 14	Legan
	9:15	**Quiz on topic of May 14 (5 pts)	Legan
	9:45	Female Reproduction II	Legan
	11:00	Patient Presentation	Wilson
May 16	9:00	READING DAY (Q & A session - no class)	Legan, Speck
May 17	8:30	Examination #1 (May 1 through May 15)	
	11:00	Exam Review	
May 20	8:30	Skeletal muscle: Mechanical properties	Gong
	10:00	Principles of circulatory function	Randall
May 21	8:30	Cardiac electrophysiology	Randall
	9:00	Congestive heart failure	Booth
	10:00	The electrocardiogram	Randall
May 22	8:30	The electrocardiogram II	Randall
	10:00	The ECG as a diagnostic tool	Randall
Sign-up for 1 hour lab between 1-5 PM on May 28 or May 29			
May 23	8:30	Cardiac muscle mechanics	Randall
	10:00	The cardiac cycle	Randall
DATE	TIME	TOPIC	INSTRUCTOR
May 24	8:30	Cardiac pump function	Randall
	10:00	Regulation of cardiac output	Randall
	11:30	Quiz on material 5/21-5/23 (10 pts)	
May 27		Memorial Day Holiday, (no class)	
May 28	8:30	Basic hemodynamics	Richardson
		Structure of the microcirculation	Richardson
		Clinical application: Claudication	Richardson
May 29	8:30	Regulation of tissue blood flow	Richardson
		Signal transduction in vascular smooth muscle	Richardson
May 30	8:30	Blood/tissue exchange: Filtration	Richardson
		Blood-tissue exchange: Diffusion	Richardson
		Quiz on hemodynamics (material from May 28-29) (10 pts)	
		Q & A session on Richardson material	
May 31	8:30	Regulation of arterial BP	Randall
	10:00	The coronary circulation	Randall
June 3	8:30	Structure and function of the lungs	Lee
	10:00	Lung volumes and alveolar ventilation	Lee
	11:00	Demonstration of lung volume measurement	Lee & Speck

June 4	8:30	Elastic properties of the lungs	Lee
	9:30	Resistive properties of the lungs	Lee
	10:30	Problem Solving	Lee
June 5	8:30	Pulmonary circulation	Lee
	9:30	Pulmonary gas exchange	Lee
	10:30	Clinical case: Rationale and procedures for ventilatory mechanics	Bowe
	11:30	Quiz on topics of June 3 - 4 (10 pts)	
June 6	8:30	Blood gas transport	Lee
	9:30	Mechanisms of hypoxia and hypercapnia	Lee
	10:30	Clinical case: Chronic obstructive pulmonary disease	Morehead/Lower/Lee
June 7	9:00	READING DAY (Q & A session - no class)	Lee, Randall, Richardson
June 10	8:30	Examination #2 (May 20 through June 6)	
	11:00	Exam review	Speck

DATE	TIME	TOPIC	INSTRUCTOR
June 11	8:30	Control systems in respiration Chemoreceptors Mechanoreceptors	Speck Speck Speck
June 12	8:30	Adaptations to respiratory pathologies Respiratory adaptations to exercise Integration of mechanics and control	Speck Speck Speck
June 13	8:30	Question and answer/review	Speck
	9:00	Quiz on regulation of breathing (10 pts)	
	9:30	Stem Cell Interactions	Van Zant
	11:00	Regulation of body temperature	Speck
June 14	8:30	Basic renal processes	Ott
	10:00	Determination of renal function	Ott
June 17	8:30	Structure and function of normal sleep Taking a sleep history and sleep testing Sleep apnea and narcolepsy	Phillips Phillips Phillips
June 18	8:30	Body fluid volumes and osmotic shifts	Ott
	10:00	Clinical application: Renal failure	Sawaya
June 19	8:30	Renal hemodynamics	Jackson
	10:00	Proximal tubule transport	Jackson
June 20	8:30	Water metabolism	Jackson
	10:00	Sodium metabolism	Jackson
June 21	8:30	Salt and water integration	Ott
	9:30	Quiz on lectures through June 20 (10 pts)	Ott
	10:00	Potassium metabolism	Ott
June 24	8:30	Hydrogen metabolism I	Ott
	10:00	Clinical acid/base diagnosis	Ott
June 25	8:30	Problem Set - mini-clinical cases	Ott/Grider
	10:00	Clinical acid/base problems	Ott/Grider
June 26	8:30	Pathology - congestive heart failure	Ott
	9:30	Pathology - kidney and hypertension	Ott
	10:30	Open session - review questions	Ott
June 27	9:00	READING DAY (Q & A session - no class)	Ott, Speck
June 28	8:30	Examination #3 (June 10 through June 26)	
	11:00	Exam Review	Speck