**University of Pittsburgh School of Pharmacy**

**PHARM 5115 - Anatomy and Physiology II: *A Pharmacologist’s Perspective***

**Spring Term 2164 Syllabus**

The PharmD Program prepares student pharmacists to be health care practitioners who optimize the health of patients and society through the effective use of medicines and other interventions. The PharmD Program inspires students to advance the profession by fostering collaboration, lifelong learning, leadership, professionalism, and civic engagement.

**Course Title, Number, Credit Allowance**

Anatomy and Physiology II: *A Pharmacologist’s Perspective*, PHARM 5115, 3 credits

**Professional Year and Terms Offered**

Professional Year 1, Spring Term

**Days, Times, Locations (see schedule on p. 5)**

Monday 10:00 - 10:50 am, 355 Salk Hall

Tuesday 10:00 - 10:50 am, 355 Salk Hall

Thursdays 10:00 - 10:50 am, 456 Salk Hall

**Prerequisites / Corequisites**

Completion of pre-pharmacy required courses

Anatomy and Physiology I

**Participating Faculty**

Course Administrator:

Susan M. Parnell

Education Support Specialist

Office: 728 Salk Hall

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Course Coordinator: Course Co-coordinator:

Christopher R. Ensor, PharmD, BCPS-CV Thomas D. Nolin, PharmD, PhD, FCCP, FCP, FASN

Assistant Professor, Pharmacy and Medicine Assistant Professor, Pharmacy and Therapeutics

Office: 708 Salk Hall Office: 210 Salk Pavilion

Email: chris.ensor@pitt.edu Email: nolin@pitt.edu

Content: Endocrine and Pulmonary Systems Content: Renal System

Cody A. Moore, PharmD, BCPS Heather J. Johnson, PharmD, BCPS

Pharmacy Fellow, Solid Organ Transplantation Assistant Professor, Pharmacy and Therapeutics

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Content: Pulmonary System (Mentor: Ensor) Content: Gastrointestinal System

Gastrointestinal System (Mentor: Johnson)

Michael A. Shullo, PharmD James C. Coons, PharmD, BCPS-CV

Associate Professor, Pharmacy and Therapeutics Associate Professor, Pharmacy and Therapeutics

Office: UPMC Presbyterian Hospital A346.3 Office: 126 Falk Clinic

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Content: Cardiovascular System Content: Cardiovascular System

**Course Description**

Anatomy and Physiology II is the second of a two-course sequence which provides a comprehensive overview of human anatomy and human physiology. The course content is designed to encompass the eleven organ systems that comprise the human organism. The functional anatomy and the physiologic processes of each system are presented in the context of how the system contributes to the homeostatic maintenance of a stable cellular environment and the overall well-being of the organism. The course is designed to sequentially progress from the development of an understanding of normal physiology to the introduction of pathophysiologic conditions. The basic scientific content of the course is purposefully structured to provide the anatomic and physiologic background prerequisite for courses that follow in the second and third professional years (courses identified as therapeutic modules). Because knowledge of anatomy and physiology underlies the disciplines of pharmacology and pharmacotherapy, numerous examples of drugs and drug actions are incorporated into the presentations. Key topics in Anatomy and Physiology II include: (1) Cardiovascular System, (2) Renal System, (3) Pulmonary System, (4) Gastrointestinal System, and (5) Endocrine System. Students who successfully complete Anatomy and Physiology II will develop an active and practical knowledge of these areas.

**PittPharmacy Outcomes Addressed by the Course**

1. Learner
2. Problem Solver
3. Innovator

**Key Words Identifying Core Content**

1. Human anatomy
2. Human physiology
3. Pathology/pathophysiology
4. Pharmacology

**Learning Objectives**

Anatomy and Physiology II is the second of two sequential basic science courses. The student successfully completing these courses will be able to demonstrate proficiency in describing the structure and function of the eleven major organ systems.

1. Utilize proper nomenclature for standard anatomical structures and their relationship to each other. *General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).*
2. Describe key physiological processes that enable the system to contribute to the well-being of the whole organism. *General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).*
3. Describe overarching contribution of organ systems to the homeostatic maintenance of suitable conditions for all cells of the organism. *General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).*
4. Identify pharmacologic agents and relate how the principle actions of these agents are intrinsically tied to their impact on physiologic and pathophysiologic processes. *General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).*
5. Utilize knowledge of anatomy and physiology to the assessment and solution of clinical problems. General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).
6. Navigate complexity of the whole organism, to organ system, to organ, to tissue, to cell and to the molecular level. *General Ability Outcomes #1 (Critical Thinking) and #2 (Development of Knowledge & Skills).*

**Methods of Learning**

Didactic lectures (synchronous and asynchronous formats), reading assignments, pharmacology cases, group work, and self-study are employed as methods of learning in this course.

**Textbooks and Other Learning Resources**

Selected E-Books will be used as resources for this course. Students enrolled in the School of Pharmacy at the University of Pittsburgh have access to these texts. Students are able to use these books at no charge by logging onto the Health Sciences Library System (HSLS) website. Textbooks that will be used in this course include:

1. Barrett KE, Boitano S, Barman SM, Brooks HL, eds. *Ganong’s review of medical physiology*. 24th ed. USA, The McGraw-Hill Companies, 2012.
2. Mohrman DE, Heller LJ, eds. *Cardiovascular physiology*. 8th ed. USA, McGraw-Hill Education, 2014.
3. Eaton DC, Pooler JP, eds. *Vander’s renal physiology.* 8th ed. USA, McGraw-Hill Education, 2013.
4. Brunton L, Chabner B, Knollman B, eds. *Goodman & Gilman’s the pharmacological basis of therapeutics.* 12th ed. USA, The McGraw-Hill Companies, 2011.

To access the textbooks utilize the URL http://www.hsls.pitt.edu/ Select the drop down tab for Books. Select: Health Science E-Books by Subject. And finally, select: Physiology.

If you are using a computer that is not directly connected to the PittNet use the "Remote Access" tab to log on when you first enter the HSLS website. Log on to Remote Access using your Pitt username and password.

**Course Requirements and Grading**

Examinations: *All exams will be given in Scaife 6. Exams will begin at 9:30 AM and will be collected at 10:50 AM.* There will be **three** exams. Each examination will be worth 50 points will count for 60% (20% x 3 exams) of the final course grade. If you cannot be present for an examination, because of illness or extraordinary circumstances, you must contact one of the course coordinators before the exam starts. Failure to do this will result in an automatic forfeiture of 50 points. The legitimacy for missing an examination will be determined by the course coordinators and is not debatable. Excuses for medical reasons require written verification by an appropriate health care provider. The type of make-up examination to be given will be at the discretion of the course coordinators.  It is the student’s responsibility to make arrangements with the course coordinator to take the make-up exam. This must be done within 10 days after the exam or 3 days after returning to classes, whichever comes first.  There will be no make-ups allowed for exams missed due to unexcused absences. Unless authorized by the instructor, use of electronic devices of any kind during examinations is prohibited and is considered to be an act of academic misconduct.

Unannounced quizzes: All quizzes will be given by clicker in the assigned classroom for that day. There will be 10 quizzes of 4 points each which will be worth 40 points and count for 16% of the final course grade.

Case work: There will be 10 group cases. Responses to case method work will be worth 40 points and count for 16% of the final course grade. Attendance is required. Grading will be performed on the rubric enclosed in Appendix A.

Peer rating: Peer rating of your group members will be conducted on the final class day and attendance is required. Peer rating will be worth 20 points and count for 8% of the final course grade. Rating will be performed on the rubric enclosed in Appendix B.

Requirements Summary:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Points per item** | **Number of Items** | **Total Points** | **% of Final Grade** |
| Exams | 50 | 3 | 150 | 60% |
| Quizzes | 4 | 10 | 40 | 16% |
| Case Work | 4 | 10 | 40 | 16% |
| Peer Rating | 20 | 1 | 20 | 8% |
| - | - | - | Total 250 | Total 100% |

Grading Scale:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Points** | **Percent** | **Grade** |  | **Points** | **Percent** | **Grade** |
| 232 - 250 | 93 – 100% | A . |  | 182 - 191 | 72.6 - 76.5% | C . |
| 224 - 231 | 89.6 - 92.9% | A - |  | 174 - 181 | 69.6 - 72.5% | C - |
| 217 - 223 | 86.6 - 89.5% | B + |  | 167 - 173 | 66.6 - 69.5% | D + |
| 207 - 216 | 82.6 - 86.5% | B . |  | 157 - 166 | 62.6 - 66.5% | D . |
| 199 - 206 | 79.6 - 82.5% | B - |  | 150 - 156 | 60 - 62.5% | D - |
| 192 - 198 | 76.6 - 79.5% | C + |  | 0 - 149 | 0 - 59.9% | F . |

**Class Attendance Policy and Grade Implications**

Student attendance at each class session is required.

Unexcused absences: No make-up work/remediation will be provided. Student forfeit any points generated from class activities conducted during the missed class session.

Excused absences: *may* include such occurrences as dangerous weather conditions, student illness/medical leave (a student who misses an exam, a graded activity, or a consecutive series of classes due to illness will be asked to provide a signed note from his or her physician), funerals, and attendance at professional meetings. Students must negotiate an anticipated absence in advance with the course coordinator. Students are responsible for completing missed work, exams, or assignments may be given a make-up assignment so as to earn points generated from class activities conducted during the missed class session.

Special note regarding professional meetings: Students are encouraged to attend professional meetings for their own professional development (e.g., local pharmacy organizations, APhA-ASP ASHP, and PPA) and at times, to search for gainful employment or residency opportunities after graduation. If there is an anticipated conflict between the course meeting time and the meeting/event, the student is responsible for meeting with the course coordinator at the earliest opportunity and at least one month prior to the event to request an excused absence. The course coordinator will assign make-up work for missed course activities and, if a student misses an exam, the course coordinator will administer a make-up exam in the week following the student’s return.

**Student Disability Statement**

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 140 William Pitt Union, 412-648-7890 or 412-383-7355 (TTY) as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

**Recording Policy**

To ensure the free and open discussion of ideas, students may not record, in any medium, classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance should be used solely for the student’s own private use.

**Academic Integrity Statement**

Students enrolled in the pharmacy program are also considered to be members of the pharmacy profession and must adhere to the same professional, ethical, and legal standards. It is a violation of the School’s Code of Conduct Policy for a student to engage in any act of academic misconduct, such as cheating, plagiarism, deceitful practice, unauthorized collaboration, harassment, or breach of confidentiality. It is also considered to be a violation of the Code for a student to tolerate any of the aforementioned acts by other students. Unless authorized by the instructor, use of electronic devices of any kind during examinations is prohibited. Use of a personal digital assistant, palm top computer, cellular telephone or other electronic device during an examination is considered to be an act of academic misconduct.

**PHARM 5115 - Anatomy and Physiology II: *A Pharmacologist’s Perspective* (Spring Term 2164) Course Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Instructor** | **Topics** | **PittPharmacy Outcome** |
| **Part I: Cardiovascular System – Lecture** | | | |
| Jan 7 | Shullo | Introduction to the cardiovascular system | 1 |
| 11 | Shullo | Anatomy of the heart | 1 |
| 12 | Shullo | Anatomy of the blood vessels | 1 |
| 14 | Coons | Cardiac electrophysiology | 1 |
| 18 | *-* | *No class: Martin Luther King Day* | - |
| 19 | Shullo | Cardiac contractility | 1 |
| 21 | Shullo | The cardiac cycle | 1 |
| 25 | Shullo | Hemodynamics: pressure, flow, and resistance | 1 |
| 26 | Coons | Intrinsic regulation of the cardiovascular system | 1 |
| 28 | Coons | Neural control of the cardiovascular system | 1 |
| **Feb 1** | **Proctor: Shullo** | **Exam 1 in Scaife 6: Covers January 7 - 28** | **-** |
| 2 | Coons | Capillary dynamics and lymphatics | 1 |
| 4 | Coons | Body fluid homeostasis | 1 |
| **Part II: Renal System – Lecture** | | | |
| 8 | Nolin | Renal physiology: overview of basic process | 1 |
| 9 | Nolin | Renal anatomy and function | 1 |
| 11 | Nolin | Renin angiotensin aldosterone system (RAAS) | 1 |
| 15 | Nolin | Regulation of sodium, chloride, and water I | 1 |
| 16 | Nolin | Regulation of sodium, chloride, and water II | 1 |
| 18 | Nolin | Regulation of potassium | 1 |
| 22 | Nolin | Acid-base balance | 1 |
| 23 | Nolin | Regulation of calcium and phosphate | 1 |
| **25** | **Proctor: Nolin** | **Exam 2 in Scaife 6: Covers February 2 - February 23** | **-** |
| **Part III: Endocrine System – Case Method** | | | |
| 29 | Ensor | Functional anatomy of the mammalian endocrine system | 1, 7, 11 |
| Mar 1 | Ensor | Pituitary gland I: Neurohypophyseal hormones | 1, 7, 11 |
| 3 | Ensor | Pituitary gland II: Adenohypophyseal hormones | 1, 7, 11 |
| 6-13 | *-* | *No class: Spring Break* | - |
| 14 | Ensor | Thyroid gland I: Iodine metabolism and thyroid hormones | 1, 7, 11 |
| 15 | Ensor | Thyroid gland II: Thyroid function testing and thyroid disorders | 1, 7, 11 |
| 17 | Ensor | Parathyroid glands: Calcium homeostasis and metabolism | 1, 7, 11 |
| 21 | Ensor | Adrenal glands: Corticosteroids | 1, 7, 11 |
| 22 | Ensor | Pancreas: Structure and function | 1, 7, 11 |
| 24 | Ensor | Pancreas II: Dysregulation | 1, 7, 11 |
| 28 | Ensor | Male and female reproductive hormones | 1, 7, 11 |
| **Part IV: Pulmonary System – Case Method** | | | |
| 29 | Moore/Ensor | Functional anatomy of the respiratory system I | 1, 7, 11 |
| 31 | Moore/Ensor | Functional anatomy of the respiratory system II | 1, 7, 11 |
| Apr 4 | Moore/Ensor | Mechanics of breathing | 1, 7, 11 |
| 5 | Moore/Ensor | Transport of oxygen and carbon dioxide | 1, 7, 11 |
| 7 | Moore/Ensor | Control of respiration and effects of exercise and age | 1, 7, 11 |
| **Part V: Gastrointestinal System – Case Method** | | | |
| 11 | Moore/Johnson | Functional anatomy of the digestive system | 1, 7, 11 |
| 12 | Moore/Johnson | Accessory digestive organs | 1, 7, 11 |
| 14 | Moore/Johnson | Mechanical processes involved in digestion | 1, 7, 11 |
| 18 | Moore/Johnson | Secretions of the digestive system | 1, 7, 11 |
| 19 | Moore/Johnson | Chemical composition of foods, digestion, and absorption | 1, 7, 11 |
| 21 | **Proctor: Ensor** | **Exam 3 in Scaife 6: Covers February 29 - April 19** | **-** |

**Appendix A: Pharmacology Case Method Grading Rubric**

Group:

Date:

Evaluator:

**Rate the items below using the following Likert scale:**

5: agree strongly

4: agree

3: neither agree nor disagree

2: disagree

1: disagree strongly

**Category Criteria Rating**

Rationale Chosen strategies are paired with sufficient mechanistic

rationale to justify their use

Standard Chosen strategies reflect gold-standard approaches

- *or* -

Innovative Chosen strategies reflect novel approaches

Rational Chosen strategies may be rationally used

Accurate Chosen strategies accurately address needs

Complete Chosen strategies sufficiently address needs

Mean =

**Appendix B: Peer Participation Grading Rubric**

Group:

Evaluator:

Colleague being evaluated:

**Rate your colleague on the items below using the following Likert scale:**

5: agree strongly

4: agree

3: neither agree nor disagree

2: disagree

1: disagree strongly

**Category Criteria Rating**

Preparedness Comes to group meetings ready to actively participate

in discussion and work

Openness Leaves preconceived notions at the door and finds value in

the thoughts and opinions of the group

Cooperation Works well with the group to achieve the collective

benefit of the project

Contribution Takes on a proportionally similar burden of work relative

to the other group members

Mean =