

Physiological Basis of Disease
(MSBS 5025S; Rutgers 16:761:600)
Fall 2017 (3 Credits)

Course Times: Mondays and Thursdays, 1:40 – 3:00 pm

Classroom: Pharmacy Room 115,
William Levine Hall-Ernest Mario School of Pharmacy
160 Frelinghuysen Rd., Piscataway, NJ 08854

Course Director:

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Co-Director:

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Course Lecturers:

Drs. Fan, Fondell, Gow, Jacinto, Runnels, Tamasi, Weiss, Zachow

Course Description: This is a lecture/discussion course that covers systems physiology and relates these concepts to disease. The course is divided into several organ systems starting with an in depth discussion of the normal physiology of each system, that in turn sets the foundation for understanding the pathophysiology of each system. Included are discussions of cardiovascular, pulmonary, renal, gastro-intestinal, bone, and endocrine systems in the context of normal function, as well as the effect and consequences of representative pathophysiological conditions. This is a team taught course with a total of 24 formal lectures. There will be three non-cumulative exams each covering approximately one third of the course. Each exam will count for approximately one third of the total grade. Masters students will be given multiple-choice exams while PhD students will be given essay exams.

Course Goals and Objectives:

1. Explain the integrative biology of organ systems.
2. Describe principles of physiological systems common to all organs: for example, understanding of Ohms's law ($\text{Flow} = \text{Pressure head}/\text{Resistance}$, or $I \text{ (current)} = \text{voltage}/\text{resistance}$) will be useful for all lectures.
3. Describe the feedback controls and pathways underlying all physiological systems.
4. Prepare students for first year medical school: much of course lectures overlap with the physiology components of medical students' M1 curriculum at Rutgers RWJMS.
5. Use normal physiology knowledge to predict pathological processes.
6. Describe how pathological processes disrupt normal function.
7. Apply a basic understanding of physics and chemistry to the context of human physiology.

Grading Criteria:

- A: approximate top 25%
- B+: approximate second highest quarter
- B: most of the remaining
- C+: between 1 to 1.5 standard deviations below the mean
- C: between 1.5 to 2 standard deviations below the mean
- F: more than 2 standard deviations below the mean

Study Guides and Textbooks:

Given the multiple lecturers and wide array of topics and systems covered in this course, **no one single textbook is used**. General physiology textbooks such as *Costanzo* or *Guyton and Hall* (see below) may be useful for some students but are not required. For several of the lectures, specific lecture handouts (*ebooks*), review articles, or study guides will be posted along with power point lecture slides at the RWJMS AMP course website (<https://rwjmsamp.rwjms.rutgers.edu>). In some cases, lecturers may recommend specific book chapters or pages in a specific text available online via the Rutgers RWJMS Library website or at the Academic Resource Center (ARC) (RWJMS Kessler Teaching Wing, N207). Some lecturers may additionally provide practice exam questions, but note that practice questions may not necessarily reflect the actual content on the graded exam, but rather provide examples of the style or format of questions you'll encounter on the actual exam.

Suggested (non-required) Textbooks:

Guyton and Hall: Textbook of Medical Physiology, 13th ed., 2016. Available at ARC and online at <https://www.clinicalkey.com#!/browse/book/3-s2.0-C20120065131>

Costanzo: Physiology, 5th ed., 2014. Available at ARC and online at <https://www.clinicalkey.com#!/content/book/3-s2.0-B9781455708475000133>

Barrett: Ganong's Review of Medical Physiology, 24th ed., 2012, free online version <http://www.umdnj.edu.libproxy.umdnj.edu/cgi-bin/libjournal/2436>
<http://accessmedicine.mhmedical.com/book.aspx?bookid=393>.

Robbins and Cotran: Pathologic Basis of Disease. Available in ARC and online via <https://www.clinicalkey.com#!/browse/book/3-s2.0-C20110055734>.

Hammer and McPhee: Pathophysiology of Disease, 7th ed., 2014. Available online at <http://accessmedicine.mhmedical.com/book.aspx?bookid=961>

Harrisons Principles of Internal Medicine: available at ARC and online via <http://accessmedicine.mhmedical.com/book.aspx?bookid=1130>.

Specific Lecture Texts:

Membrane Potentials, Dr. Runnels: ***Molecular Biology of the Cell***, Chapter 11 available online at <http://www.ncbi.nlm.nih.gov/books/NBK26910/>

Cardiovascular, Dr. Weiss: **Mohrman and Heller: Cardiovascular Physiology, 8th ed.**, available online at <http://accessmedicine.mhmedical.com/book.aspx?bookID=843>

Pulmonary, Dr. Gow: **Levitsky: Pulmonary Physiology, 8th ed.**, available online at <http://accessmedicine.mhmedical.com/book.aspx?bookid=575>

Gastrointestinal Physiology, Drs. Fan and Jacinto: 1) **Leonard R. Johnson: Gastrointestinal Physiology, 8th ed.**, available online at <https://www.clinicalkey.com#!/browse/book/3-s2.0-C20110067224>) and hard copies in ARC. 2) **Berne & Levy Physiology, 6th ed.**, available online at <https://www.clinicalkey.com#!/browse/book/3-s2.0-C20090617931>

Renal Physiology, Dr. Zachow: **Vander's Renal Physiology, 8th ed.**, available online at <http://accessmedicine.mhmedical.com/book.aspx?bookId=505>.

Endocrinology, Drs. Fondell and Zachow: **Patricia Molina: Endocrine Physiology, 4th edition:** available online at <http://accessmedicine.mhmedical.com/book.aspx?bookid=507>.

Bone Physiology, Dr. Tamasi: **J.P. Bilzekian, L.G. Raisz, and G.A. Rodan: Principles of Bone Biology, 3rd ed.**, available online at <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&AN=248939>

Review books/practice questions:

Costanzo: Physiology Cases and Problems, 3rd ed., a limited number of copies are available at Rutgers RWJMS Academic Resource Center (ARC); Excellent review through clinical cases.

Costanzo: Board Review Series (BRS) Physiology, 5th ed., a limited number of copies are available at Rutgers RWJMS Academic Resource Center (ARC); Excellent review of systems physiology along with USMLE-style practice questions with answers.

Guyton & Hall Physiology Review, a limited number of copies are available at Rutgers RWJMS Academic Resource Center (ARC); the book has many practice questions including case-based questions.

Note: all ebooks can also be accessed off campus

By Subject: https://www.libraries.rutgers.edu/health_sciences/ebooks_by_subject.

By Title: http://www.libraries.rutgers.edu/health_sciences/ebooks_by_title

Physiological Basis of Disease, Fall 2017 Schedule

Week	Lecture	Date	Lecturer	Topic	Note
1	1	Thursday 09/07	Dr. Runnels	Membrane potential and excitability	20 min. course intro.
2	2	Monday 09/11	Dr. Weiss	Cardiovascular: Electrical activity, ECG	
	3	Thursday 09/14	Dr. Weiss	Cardiovascular: Control of cardiac function and cardiac output	
3	4	Monday 09/18	Dr. Weiss	Cardiovascular: Microcirculation	
	5	Thursday 09/21	Dr. Gow	Pulmonary mechanics and circulation	
4	6	Monday 09/25	Dr. Weiss	Cardiovascular: Acute myocardial ischemia, heart failure	
	7	Thursday 09/28	Dr. Gow	Oxygen/CO ₂ exchange, V/Q balance, Respiratory control of pH	
5	8	Monday 10/02	Dr. Gow	Hypoxemia, V/Q disorder, pulmonary disease	
		Thursday 10/05		Pre-Exam 1 review	Optional self study
6		Monday 10/09		Exam 1	time and room to be announced
		Thursday 10/12		Post-Exam 1 review	11 am – 12 noon, Room C1 Kessler Teaching Labs
	9	Thursday 10/12	Dr. Zachow	Renal: Body fluid balance, GFR, renin-angiotensin-aldosterone system	
7	10	Monday 10/16	Dr. Zachow	Renal: Hormonal regulation of renal Na ⁺ and H ₂ O handling: aldosterone, AVP and All; renal control of blood pressure; acid-base	
	11	Thursday 10/19	Dr. Zachow	Renal glucose handling and diabetic kidney disease; integrated renal-cardiovascular function	
8	12	Monday 10/23	Dr. Zachow	Applied renal pathophysiology cases	
	13	Thursday 10/26	Dr. Fan	Gastrointestinal: overview, motility	
9	14	Monday 10/30	Dr. Fan	Gastrointestinal: secretion	
	15	Thursday 11/02	Dr. Jacinto	Gastrointestinal: digestion/absorption	
10	16	Monday 11/06	Dr. Fan	Pathophysiology of selected GI diseases	
		Thursday 11/09		Pre-Exam 2 review	Optional self study
11		Monday 11/13		Exam 2	time and room to be announced
		Thursday 11/16		Post-Exam 2 review	11 am – 12 noon, Room C1 Kessler Teaching Labs

Week	Lecture	Date	Lecturer	Topic	Note
11	17	Thursday 11/16	Dr. Jacinto	Endocrine pancreas	
12	18	Monday 11/20	Dr. Fondell	General principles of the neuroendocrine system	
		Thursday 11/23		Thanksgiving	No Class
13	19	Monday 11/27	Dr. Fondell	Thyroid endocrinology	
	20	Thursday 11/30	Dr. Fondell	Adrenal endocrinology	
14	21	Monday 12/04	Dr. Fondell	Male reproductive endocrinology	
	22	Thursday 12/07	Dr. Zachow	Female reproductive endocrinology (1)	
15	23	Monday 12/11	Dr. Zachow	Female reproductive endocrinology (2)	
	24	Thursday 12/14	Dr. Tamasi	Bone physiology and pathology	
16		Monday 12/18		Pre-Exam 3 review	
		Thursday 12/21		Exam 3	time and room to be announced

Contact Information for Course Lecturers:

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