

**PSL 450 (Sec 001): Physiology in Health and Disease (3 Cr)**  
**Fall Semester 2016**  
**Meeting Time: Tuesdays and Thursdays from 2:40-4:00 pm**  
**Room: A155 Plant and Soil Science**

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### Course Syllabus

Course Overview: Maintenance of a healthy state requires a dynamic interaction between living systems and their environment, governed by fundamental principles of physiology such as those introduced in PSL 431 and PSL 432. Underlying these interactions is a genetic blueprint that specifies the structure and function of macromolecules, cells, tissues, and organ systems, all of which have evolved to maintain physiological parameters (such as body temperature, body weight, food intake, plasma glucose, blood pressure and volume, blood gas concentrations, electrolyte levels, cell death and renewal, and others) within an acceptable range of values in the face of an inconstant environment. Viewed in this light, disease progression represents a shift in this natural balance, triggered either by an alteration in the genetic blueprint, a change in the internal milieu, or by a change in the environment that shifts one or more of these parameters away from its normal range, or to a different “steady state”. Such changes rarely occur in isolation due to the complex interplay that exists between cells, tissues, and organ systems. In short, physiology seeks to understand the dynamic interactions between numerous variables within a complex living system.

This course will be organized into five domains, each of which will address a clinically significant topic in physiology. Our goal will be to cover a limited number of topics in depth, contrasting important differences in physiological states between health and disease. There will be periodic discussion of the importance of genetics on disease as well as discussion of molecular mechanisms underlying fundamental physiological processes, with a focus on topics such as cell signaling, regulation of gene expression, cell growth and differentiation, cell survival, and inflammation and how they shape disease progression. Emphasis will be placed on key physiological processes and chronic conditions related to cell signaling, metabolic disorders, epilepsy, neoplasia, and degenerative retinal diseases. Discussion of animal models will be introduced where they help to clarify the underlying mechanisms involved in human disease. Where suitable, students are encouraged to review background material that was covered in the corresponding chapters of the physiology textbook(s) that were used in PSL 431 and PSL 432, (e.g., Sherwood’s *Human Physiology*). Required readings will consist of review articles and research papers that will be distributed through the course website. Student grades will be based on three exams, plus points awarded for in-class participation (iClickers and team projects).

The topics to be covered in Fall 2016 will include:

Instructor	Theme / System	Associated Pathophysiology
Miksicek	Role of Genetics and Cell Signaling in Physiology - GPCRs	GPCRs involved in Control of Respiration
Olson	Physiology of Metabolism	a) Leptin and the Control of Appetite b) Regulation of Bile Acid Synthesis
Cox	Nervous System	Seizure Disorders & Epilepsy
Gallo	Growth, Differentiation, and Cell Survival	Neoplasia
Busik	Vision	Retinopathies and Macular Degeneration

Schedule and Topics for Fall 2016:

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**Topic I – Role of Genetics and Cell Signaling in Physiology and Disease**  
**Subtopic: GPCRs and Disease (Miksicek) – 5 class periods**

Week 1 (Thurs, 9/1)

Week 2 (Tues 9/6 and Thurs 9/8)

Week 3 (Tues 9/13 and Thurs 9/15)

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**Topic II - Physiology of Metabolism (Olson) – 5 class periods**

Week 4 (Tues 9/20 and Thurs 9/22)

Week 5 (Tues 9/27 and Thurs 9/29)

Week 6 (Tues 10/4)

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**Thursday, October 6 Exam 1 (Topics I and II)**

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**Topic III – Central Nervous System and Seizure Disorders (Cox) – 5 class periods**

Week 7 (Tues 10/11 and Thurs 10/13)

Week 8 (Tues 10/18 and Thurs 10/20)

Week 9 (Tues 10/25)

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**Topic IV - Regulation of Cell Growth and Differentiation; Cancer (Gallo) – 5 class periods**

Week 9, cont. (Thurs 10/27)

Week 10 (Tues 11/1 and Thurs 11/3)

Week 11 (Tues 11/8 and Thurs 11/10)

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**Tuesday, November 15 Exam 2 (Topics III and IV)**

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**Topic V – Visual System: Retinopathies & Macular Degeneration (Busik) – 5 class periods**

Week 12, cont. (Thurs 11/17)

Week 13 (Tues 11/22 and No class on Thanksgiving (Thurs 11/24)

Week 14 (Tues 11/29 and Thurs 12/1)

Week 15 (Tues 12/6)

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**Thursday, December 8 Exam 3 (Topic V only)**

Contact Information for Course Faculty:

Richard Miksicek, Ph.D. (Course Coordinator)

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Office Hours: Tuesdays at 4:00 pm

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Office Hours: to be announced

Kathleen Gallo, Ph.D.

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Office Hours: to be announced

Julia Busik, Ph.D.

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Email: [busik@msu.edu](mailto:busik@msu.edu)

Office Hours: to be announced

**COURSE WEBSITE:** The Desire2Learn (D2L) course website will be a crucial resource for this course. Assigned readings, lecture notes and outlines will be posted to the D2L website prior to each lecture and can be used during lecture. Students should be prepared to access lecture material from each of the following file formats: MS Word (.doc or .docx), MS Powerpoint (.ppt or .pptx), and Adobe Reader (.pdf). Navigate to <http://d2l.msu.edu> and click on: FS15-PSL-450-001 - Physiology in Health & Disease

The D2L web site is also the preferred means of communication between faculty and students, therefore students should login to the course D2L web site on a regular basis. Course announcements will be periodically posted to the D2L course site. Questions and comments about course content may also be handled through D2L. You should configure your D2L preferences for email forwarding, since e-mail posted through D2L may only be accessible from within the D2L system and may not be auto forwarded to your preferred email account without setting up autoforwarding. For this reason, communication with specific faculty members about individual matters, scheduling an appointment, etc., should be directed to the faculty member's @msu.edu address, not via D2L. E-mail about missed exams, course grades, and other course issues should be sent directly to the Course Coordinator, Dr. Miksicek ([miksicek@msu.edu](mailto:miksicek@msu.edu)).

**CLASSROOM ATTENDANCE:** Lectures will *not* be recorded and the assigned readings and lecture PowerPoints will be the only out-of-class resources provided for student learning. As a result, much of your learning will occur by attending lecture and participating in the accompanying in-class discussions. Regular attendance will therefore be important for students to earn iClicker points, credit for team projects, and to perform well on the course exams.

**CLASSROOM PARTICIPATION:** We will be using REEF Polling by iClicker to monitor attendance and to promote classroom discussion, as well as to encourage students to come to class prepared by completing their assigned readings beforehand. Students are responsible for purchasing and maintaining their own polling device (iClicker remote or REEF-compatible polling device) and ensuring that is properly registered. Make sure that your device is charged, or carry extra batteries! Instructions pertaining to the use of REEF Polling will be provided in class and are also available on the REEF website under the “Support” tab ( <http://support.reef-education.com/> ) or by simply clicking on “Register Your Device” in the pop-up window. Students may also use laptops, iPhones, iPads, or other “smart” devices in addition to traditional iClicker remote devices, simply by registering them with the REEF polling system.

**REVIEW SESSIONS:** There will be no *scheduled* review sessions for this course. It is recommended that, when questions arise about course content, assigned readings, or exam preparation, that such questions should be asked in class, or posted to the corresponding course discussion forum for each of the five course domains. In addition to inviting feedback and clarification from classmates, these discussion forums will be monitored by the faculty member assigned to each domain.

**THREE “MIDTERM” EXAMS** will be on Thursday Oct.6 at 2:40 pm, on Tuesday Nov. 15 at 2:40 pm, and on Thursday December 8 at 2:40 pm in A155 Plant and Soils Sciences (see course schedule). These exams will be based both on lecture material and on assigned readings, as well as on experimental data similar to those discussed in class. In addition to assessing your knowledge and recall of material covered in lecture, exam questions will also require you to synthesize information and analyze and interpret unfamiliar data. Students with a legitimate emergency, such as illness, will be permitted to take a make-up exam if written documentation is provided confirming the problem. Such documentation must be provided by a physician or other disinterested party. For example, documentation from Olin Health Center must include a "recommendation for excused absence" on the "Patient Instruction Sheet." Such documentation, in whatever form, must be submitted to Dr. Miksicek (Course Coordinator) 24 Hrs before the make-up is given. If possible, notification prior to missing the exam is highly desirable. Arrangements to schedule a make-up exam should be negotiated with Dr. Miksicek as soon as possible, preferably within 24 hours of the missed exam.

**NO QUESTIONS ON CONTENT WILL BE ANSWERED DURING EXAMS**, as this may unfairly advantage some students over others. Exams will be computer scored based only on the answers entered on scantron sheets. Exam results will be sent by email directly from the MSU Scoring Office to each enrolled student, usually within one week of the exam date. It is the responsibility of each student to ensure that his/her examination was graded correctly. Additional credit on an examination because of scoring errors and/or student appeals to re-evaluate individual questions must be submitted to the course coordinator or the relevant instructor within one week of the time exam results are distributed. To receive consideration, such appeals must be submitted in writing (e.g., by e-mail) and should include justification for why an alternate answer deserves to receive credit. You **CANNOT** appeal a question that you failed to answer on the scantron sheet.

FINAL EXAM: There will be NO comprehensive final.

GRADING: This course will be graded on the basis of 250 PTS from 2 hourly midterm exams (90 pts each) and a third exam worth 45 pts scheduled on the last day of class, as specified below in the course calendar. In addition, 10% of the grade (25 points) will be based on iClicker/REEF points earned by in class participation throughout the semester. Course grades will therefore be based *primarily* on the examination results (90%) plus a *small* contribution from iClicker/REEF points (10%). There are no other provisions for bonus points, extra credit, or hardship points. Final grades (3.0, 3.5 etc.) will be determined by points earned out of the 250 possible points, based on a “curve” reflecting, in part, the faculty's subjective evaluation of student grasp of course material. In general, 4.0s will be awarded to the top 10-15% of the class. The top third of the class will receive 3.0 or better. The top 75% of the class will receive 2.0 or better. Course faculty reserve decision on the minimum score for each grade, and particularly on how to apportion the grades among the bottom 25% of the class. Petitions to re-evaluate a course grade will be considered in writing only (e.g. by e-mail) and must be submitted to Dr. Miksicek within one week after the beginning of the semester following completion of the course, according to university guidelines.

ACADEMIC HONESTY: Article 2.3.3 of the Academic Freedom Report states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, the Department of Physiology adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; the MSU Student Honor Code; and Ordinance 17.00, Examinations. Therefore, you are expected to complete all exams without assistance from any source. Students who violate MSU rules may receive a penalty grade, including - but not limited to - a failing grade on the assignment or in the course. Contact your instructor if you have any questions about this policy. (See <http://www.msu.edu/unit/ombud/honestylinks.html> and/or Spartan Life: Student Handbook and Resource Guide)

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: Students with disabilities should contact the Resource Center for Persons with Disabilities to establish reasonable accommodations. For an appointment with a disability specialist, call 884-7273 (voice), 355-1293 (TTY), or visit <http://www.rcpd.msu.edu/>. Such students should identify themselves to Dr. Miksicek during the first two weeks of the course and provide a "Visa" issued by the RCPD office. Dr. Miksicek will also be responsible for the Alternative Testing Site Authorization forms. Note that arranging for alternative testing at the time of each exam is the responsibility of the student and is done at the RCPD office in Rm 120 Bessey Hall.

COURSE AND INSTRUCTOR EVALUATIONS: The Department of Physiology participates in the SIRS Online system for all of its undergraduate courses, including PSL 450. Students are encouraged to submit their opinions of the course and individual instructors at the end of each semester through SIRS Online at <https://sirsonline.msu.edu/>. Students will be required to complete the SIRS Online form or to indicate within the form that they decline to participate. Otherwise, final grades may be sequestered for several days following the deadline for submission of course grades. Student anonymity is carefully protected and students have the option of “opting out” of the course evaluation survey.

GRIEF ABSENCE: In the event of loss of a family member or similar tragedy, students are directed to the university policy on Grief Absence that can be found at the Spartan Life Online website:

<http://splife.studentlife.msu.edu/regulations/selected/grief-absence-policy>