



College of Natural Science

MICHIGAN STATE UNIVERSITY

PSL 450 (Sec 001): Physiology in Health and Disease (3 Cr)

Meeting Time: Tuesdays and Thursdays from 2:40-4:00 pm
Course Website: <https://d2l.msu.edu/d2l/home/1074411>
Delivery Mode: Online Synchronous Classroom Sessions Using ZOOM
Zoom Webinar Link: <https://msu.zoom.us/j/95809192497> Passcode: 450450

COURSE OVERVIEW AND DESCRIPTION:

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 existing between cells, tissues, and organ systems. In short, physiology seeks to understand the dynamic interactions between numerous variables within a complex living system and its external environment in both the healthy and disease states.

This course will be organized into five domains, each of which will address a clinically significant, disease-related 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 discussion of the impact of genetics on disease as well as discussion of molecular and cellular mechanisms underlying cellular processes and physiological adaptation. Emphasis will be placed on selected physiological processes and chronic conditions related to cell signaling, metabolic disorders, cardiac muscle physiology, brain function, and immunology. Discussion of animal and other experimental models will be introduced where they help to clarify 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 distributed through the course website. Student grades will be based on three exams, plus points awarded for “in-class participation” (iClickers and team projects).

Becoming sophisticated consumers of scientific technical and biomedical information related to physiological systems, health, and disease will require students to develop proficiency in the following general **COURSE LEARNING OBJECTIVES**:

- critically evaluating sources or information for reliability and reproducibility, as well as understanding the basis for scientific objectivity, in other words “where scientific information comes from” and “how we know what we know”
- reading, interpreting, and applying information from published scientific and technical literature, databases, and other curated sources
- understanding information that is presented in graphical and tabular form, and how to use this information to address questions related to experimental design and data interpretation applying quantitative thinking and critical reasoning to answer questions and solve problems

THE TOPICS TO BE COVERED IN FALL 2020 WILL INCLUDE:

Instructor	Theme / System	Associated Pathophysiology
Miksicek	Cell Signaling in Physiology - GPCRs	Renin-Angiotensin System, ACE2/MASG, and their implications for Covid-19
Olson	Physiology of Metabolism	a) Leptin and the Control of Appetite b) Regulation of Bile Acid Synthesis
Bazil	Physiology of Cardiac Muscle	Heart Failure
Das	Immunology	Graft versus Host Disease
Crandall	Neurophysiology	Epilepsy

COURSE PREREQUISITES: (PSL 431 and PSL 432) and Completion of Tier I Writing Requirement

Enrollment Restricted to PSL Majors with CNS and Lyman Briggs College

REQUIRED TEXTBOOK AND OTHER COURSE MATERIALS:

There will be no required textbook for this class. However, the Desire2Learn (D2L) course website will be a crucial course resource. Assigned readings, lecture notes and slides will be posted to the D2L website prior to each class for use 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 the D2L Course Website and click on: FS20-PSL-450-001 - Physiology in Health and Disease

FALL 2020 MSU HOLIDAYS AND IMPORTANT COURSE DATES (TENTATIVE *):

Fall Classes Begin: Thursday Sept 2
 University Closed: Monday Sept 7 (Labor Day Holiday)
 University Closed: Thursday Nov 26 – Friday Nov 27 (Thanksgiving Holiday)
 Fall Classes End: Friday Dec 11
 PSL 450 Exam Dates: Thurs Oct 8, Tues Nov 17, Thurs Dec 10

* All dates are subject to change due to Covid-19 emergencies

INSTRUCTOR INFORMATION:

Instructor Name	Contact Information
Richard Miksicek, Ph.D. Course Coordinator & Module 1 Instructor	Office: 2240B BPS Bldg Phone: 884-5120 Email: miksicek@msu.edu Office Hours: By Appointment
Karl Olson, Ph.D. Module 2 Instructor	Office: 3164 BPS Bldg Phone: 884-5116 Email: olsonla@msu.edu Office Hours: By Appointment
Jason Bazil, Ph.D. Module 3 Instructor	Office: 3195 BPS Bldg Phone: 884-5124 Email: jnbazil@msu.edu Office Hours: Tuesdays at 4:00 pm
Rupali Das, Ph.D. Module 4 Instructor	Email: dasrupal@msu.edu Phone: 884-5049 Office: 2195 BPS Bldg Office Hours: By Appointment
Shane Crandall, Ph.D. Module 5 Instructor	Email: cranda86@msu.edu Phone: 884-5055 Office: 2168 BPS Bldg Office Hours: By Appointment
* <u>Please Note:</u> As a result of precautions during the Covid-19 Pandemic, the university has advised faculty, staff, and students to work remotely, as much as possible. For this reason, the preferred method for contacting course instructors will be via their msu.edu addresses. Faculty offices and offices phones may be used only intermittently, and significant delays may be experienced when attempting to contact course instructors by phone.	

CLASS ATTENDANCE AND PARTICIPATION:

Regular attendance via participating in the synchronous ZOOM sessions is expected. 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 the ZOOM lecture sessions and participating in the accompanying in-class “discussions”. Regular attendance is also important for students to earn iClicker points, credit for participation in team projects (where applicable), and to perform well on the course exams. Lectures (ZOOM Webinars and Chat Room) will be recorded, but only to assist with monitoring student attendance and to create a record of each class session. There are no plans to post lecture recordings to the D2L course website.

REVIEW SESSIONS:

There will be no *scheduled* review sessions for this course although some in-class time may be used by individual instructors for exam preparation and review. 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 modules. In addition to providing a mechanism for feedback and clarification from classmates, these discussion forums will be monitored periodically by the faculty member assigned to each domain.

**REQUIRED TECHNOLOGIES: 1) Computer with Video Camera and High-Speed Internet
2) Personal subscription to iClicker Cloud / REEF Polling**

Per MSU [guidelines and policies](#), all undergraduates are required to have a laptop computer that connects to the internet, and you will need it for PSL 450. The University recommends that students have access to a stable high-speed internet connection (typically 25 Mbps service or greater). Alternately, or if you are experiencing technical issues you can use computers at the [MSU Computer Labs](#) or consult MSU resources for [How To Connect Online](#).

- Lectures will be delivered using Zoom Webinar. No camera will be required for lectures.
- Some modules may include a team project that will utilize Zoom Breakout Rooms (synchronously) and D2L Discussion Forums (for asynchronous team work). During Zoom Breakout Sessions you are expected to be on camera and to actively participate.
- Exams will be given via D2L. No camera is required for exams.

The D2L web site will also be the standard 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 email 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 auto-forwarding. 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. Email about missed exams, course grades, and other course issues should be sent directly to the Course Coordinator, Dr. Miksicek (miksicek@msu.edu).

TECHNICAL ASSISTANCE:

Visit the MSU Help site at <http://help.msu.edu>

Visit the Desire2Learn Help Site at <http://help.d2l.msu.edu>

Call the MSU IT Service Desk at (517)432-6200, (844)678-6200, or e-mail at <http://ithelp@msu.edu>

USE OF iClicker Cloud / REEF Polling:

We *will* be using iClicker Cloud (but *not* using the traditional iClicker remote devices) to promote classroom participation and to help monitor attendance. Students are responsible for selecting and maintaining their own polling device (any iClicker Cloud-compatible polling device other than iClicker remotes) and ensuring that their device is properly registered. *Viewing the **Introductory Online Video** and completing registration of an iClicker polling device by Friday September 4 will entitle students to receive iClicker credit for Week 1.* Make sure that your device is charged and that you are able to access your account on the iClicker Cloud website. Instructions pertaining to the cost and use of iClicker Cloud polling will be provided during class and are also available on the [iClicker Student Web](#). Students may use laptops, iPhones, iPads, or other “smart” devices to participate in iClicker Cloud questions, simply by following the instructions found online and registering their device with the iClicker Cloud polling system.

Since the course will be delivered within a ZOOM environment, it will *not* be possible to use traditional iClicker remote devices and the iClicker base station, so we will rely *solely* on internet enabled devices and the iClicker Cloud system for in-class polling.

SAFETY CONSIDERATIONS DUE TO COVID-19:

The relatively large size of PSL 450 makes it impossible to have socially distanced face-to-face meetings, which are essential to prevent spread of the COVID-19 virus. We will therefore conduct all course activities remotely via ZOOM and D2L. If you are on campus for other reasons, you will be expected to follow the [Mandatory Cloth Face Covering Policy](#) and [MSU Community Compact](#) to keep our community safe.

LEARNING CONTINUITY STATEMENT:

- **COVID-19:** If you have been sick with COVID-19 [symptoms](#), have tested positive for COVID-19, or have been potentially [exposed](#) to someone with COVID-19 please follow CDC guidance to [self-isolate or stay home](#). Accommodations will be made for any student who must miss class due to COVID-19 illness or self-isolation so that it will not harm their performance or put them at a disadvantage in the class. Contact [Dr. Miksicek](#) to arrange accommodations.
- **Other Serious Health or Personal Issues:** Contact [Dr. Miksicek](#) to discuss and arrange accommodations.

COURSE CONTINUITY STATEMENT:

Should a member of the PSL 450 Instructor team be required to be absent for an extended period of time, the other instructors will deliver their course content and cover their office hours. If this occurs, students will be notified of which Instructor is responsible for the content and should be contacted about it.

WEEKLY SCHEDULE OF TOPICS AND EXAM DATES FOR FALL 2020:

Introduction to PSL 450 (Miksicek)

Week 1 (Thurs, 9/3) – Lecture #1 – Course Overview and Introduction to GPCRs

Topic I - *Cell Signaling in Physiology: GPCRs – 4 class periods* *Subtopic: RAS, ACE2/MASG, and Covid-19 (Miksicek)*

Week 2 (Tues 9/8 and Thurs 9/10)

Week 3 (Tues 9/15 and Thurs 9/17)

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

Week 4 (Tues 9/22 and Thurs 9/24)

Week 5 (Tues 9/29 and Thurs 10/1)

Week 6 (Tues 10/6)

Thursday, October 8 Exam 1 (Topics I and II) – Administered On D2L

Topic III – *Physiology of Cardiac Muscle and Heart Failure (Bazil) – 5 class periods*

Week 7 (Tues 10/13 and Thurs 10/15)

Week 8 (Tues 10/20 and Thurs 10/22)

Week 9 (Tues 10/27)

Topic IV - *Immune System: Graft Versus Host Disease (Das) - 5 class periods*

Week 9, cont. (Thurs 10/29)

Week 10 (Tues 11/3 and Thurs 11/5)

Week 11 (Tues 11/10 and Thurs 11/12)

Tuesday, November 17 Exam 2 (Topics III and IV) – Administered On D2L

Topic V – *Neurophysiology: Epilepsy (Crandall) - 5 class periods*

Week 12, cont. (Thurs 11/19)

Week 13 (Tues 11/24 and No class on Thanksgiving (Thurs 11/26)

Week 14 (Tues 12/1 and Thurs 12/3)

Week 15 (Tues 12/8)

Thursday, December 10 Exam 3 (Topic V only) – Administered On D2L

GRADED COURSE ACTIVITIES:

This course will be graded on the basis of 250 PTS, as detailed below:

Points	Description	Points Available	Percentage
Module 1 (Miksicek)	iClicker points *	5	2%
	Team Project	15	6%
	Exam Questions (10 Q's)	30	12%
Module 2 (Olson)	iClicker points	5	2%
	Exam Questions (15 Q's)	45	18%
Module 3 (Bazil)	iClicker points	5	2%
	Exam Questions (15 Q's)	45	18%
Module 4 (Das)	iClicker points	5	2%
	Exam Questions (15 Q's)	45	18%
Module 5 (Crandall)	iClicker points	5	2%
	Exam Questions (15 Q's)	45	18%
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Total Points		250	100%

* iClicker points for each class session will be normalized to 1 point per day to reflect attendance and classroom participation, regardless of the number of iClicker questions asked on that day. Since every module consists of five ZOOM sessions, this represents a total of 5 iClicker points for each module.

THREE "MIDTERM" EXAMS will be delivered using D2L, as specified in the 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 understanding of material covered in lecture, exam questions will often require you to synthesize information that you have learned during the module and analyze and interpret experimental data that was presented and discussed during lecture.

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 any communication that occurs during an exam is inappropriate and may unfairly advantage some students over others. Exams will be scored within D2L and reported to the D2L course grade book. Scoring errors and/or student appeals to re-evaluate individual questions must be submitted to the course coordinator or the relevant instructor within 48 hours 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.

FINAL EXAM: There will be NO comprehensive final, however make-ups for Exam 3 may be scheduled by special arrangement during Final Exam week.

GRADING POLICY:

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 regularly scheduled day of class, as noted above in the course calendar. In addition, 10% of the grade (25 points) will be based on iClicker points earned by in class participation throughout the semester. Course grades will therefore be based *primarily* on exam results (90%) plus a small contribution from iClicker points (10%). There are no other provisions for extra credit, or hardship points. Students with point totals representing 90%, 80%, 70%, and 60% of the available points are assured of receiving minimum grades of at least 4.0, 3.0, 2.0, and 1.0, respectively. Final grades (4.0, 3.5 etc.) will be determined by the percentage of points earned out of the 250 possible points. Course faculty reserve decision on the minimum score for each grade, and particularly on how to apportion the grades among the lower quartile 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.

FINAL GRADE ASSIGNMENT (PROVISIONAL GRADING SCALE):

The table below describes the relationships between final grades** and cumulative points.

Final Grade	Cumulative Points	Percentage
4.0	225 to 250	90% to 100%
3.5	212 to 224	85% to 89.9%
3.0	200 to 211	80% to 84.9%
2.5	187 to 199	75% to 79.9%
2.0	175 to 186	70% to 74.9%
1.5	162 to 174	65% to 69.9%
1.0	150 to 161	60% to 64.9%
0.0	Below 150	Below 60%

** Course faculty reserve the right to relax the final grade cut-offs depending on the resulting distribution of student scores, however the cut-offs will not be raised compared to the table shown above.

GRADE DISSEMINATION:

All scores on iClicker quizzes, exams, and course assessments will be posted in D2L. Final course grades will be reported through the Office of the Registrar. Contact [Dr. Miksicek](#) if you wish to discuss your performance in the course or your grade in general. If you wish to discuss a content-related questions (e.g. an exam or quiz question), you should contact the instructor who presented the relevant content.

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 as an individual effort, without assistance from any other individual whether they are enrolled in the course or not. Students who violate this exam policy or other 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. (Click here for a link to the [Ombudsperson's resources](#) on academic integrity and/or [Spartan Life: Student Handbook and Resource Guide](#)).

Violations of academic integrity include:

- Plagiarism of any kind
- Submitting the work of another and falsely misrepresenting it as your own
- Collaboration or communication with another individual during an examination, using social media, text, phone, or any other electronic means
- Witnessing and failing to report a violation of academic integrity
- Commercialization of lecture notes or other university-provided course materials

SPARTAN CODE OF HONOR:

On March 22, 2016, The Associated Students of Michigan State University (ASMSU) adopted the following Spartan Code of Honor:

“As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.”

Other Course Policies

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 the [MSU RCPD Website](#) by clicking on this link. 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 by clicking on the [SIRS link](#). 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](#).

RELIGIOUS OBSERVANCES:

Students are expected to notify their instructor in advance if they intend to miss class to observe a holy day of their religious faith. Refer to the registrar's page on [religious observance policy](#). For a current schedule of major religious holidays, see the [office of inclusion and intercultural initiatives](#).

POLICIES FOR STUDENT ATHLETES:

MSU policies pertaining to student athletes may be found by clicking on this link: [Student Athletes](#)

MANDATORY REPORTING POLICY:

As professors, one of our responsibilities is to help create a safe learning environment for our students and for the campus as a whole. As members of the university community, we have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information confidentially about sexual harassment, sexual violence or discrimination to an employee who does not have this reporting responsibility, you can find a list of those individuals here <https://caps.msu.edu/>

INCLUSION AND EQUITY:

MSU is committed to creating and maintaining an inclusive community in which students, faculty, and staff can work together in an atmosphere free from all forms of discrimination. The Office of Institutional Equity (OIE) reviews concerns related to discrimination and harassment based on sex, gender, gender identity, race, national origin, religion, disability status, and any other protected categories under the University Anti-Discrimination Policy (https://www.hr.msu.edu/policies-procedures/university-wide/ADP_policy.html) and Policy on Relationship Violence and Sexual Misconduct (https://www.hr.msu.edu/policies-procedures/university-wide/RVSM_policy.html). If you experience or witness acts of bias, discrimination, or harassment, please report these to the **Office of Institutional Equity (OIE) website**: <http://oie.msu.edu/>.