

## Proposed Syllabus: Mindful Physiology

### PROFESSOR:

Diane Gilbert-Diamond, ScD, Associate Professor of Epidemiology, Medicine, and Pediatrics at the Geisel School of Medicine at Dartmouth.

**OFFICE HOURS:** (TBD: 2 hrs/wk) and by appointment

**COURSE MEETINGS:** The course meets Tuesdays and Thursdays 2:25 pm - 4:15 pm in Life Science Center Room 200.

**COURSE DESCRIPTION:** As defined by the Zen Master Thich Nhat Hanh, “Mindfulness is the awareness of what is happening inside and around us in the present moment.” This course introduces basic physiology to help students increase their understanding of and appreciation for the biological mechanisms occurring inside and around their bodies. This course also teaches basic research principles to enable students to critically evaluate research studies on the physiological effects of mindfulness. To deepen students’ understanding of mindfulness and the scientific research examined, enrolled students will engage in mindfulness practices throughout the term.

### LEARNING OUTCOMES

- Define key vocabulary, describe key features through writing and diagrams of covered biological processes and systems.
- Summarize the interconnections between the covered biological processes and systems.
- Gain experience with specific mindfulness practices.
- Gain experience observing one’s own physiology.
- Explain specific biological mechanisms that mediate the beneficial health effects of mindfulness practice.
- Identify key characteristics of examined studies including independent variables, dependent variables, objectives, hypotheses, measurement methods, statistical methods
- Contrast observational and experimental studies in terms of key design characteristics, strengths, and limitations.
- Explain the role of chance in scientific observations, how chance is evaluated through statistical hypothesis testing, and the importance of study replication.
- Describe types, sources, and consequences of measurement error and bias in human research.
- Define the concepts of confounding and mediation, and identify variables identified as such in examined study methods, results, and conclusions.
- Describe ethical considerations of human research.
- Use personal mindfulness experience to inform understanding of the scientific study of mindfulness.

**COURSE PHILOSOPHY:** The professor and students share a mutual goal of having the students attain the course learning outcomes. The professor strives to create a course structure and environment that is optimal for learning. Students should actively use that course structure and environment to learn. Assessments are used to help students pace their learning, identify any deficits in the mastery of course material, and guide students in addressing those deficits. In addition to the formal course assessments, students should continuously evaluate their progress towards meeting the course objectives to best guide their learning.

### RESPONSIBILITIES & EXPECTATIONS:

Students in this course are expected to:

1. Read the assigned material before each class.
2. Keep track of course activities and announcements via our Canvas site.
3. Attend class and actively engage in class activities and discussions.
4. Complete assignments and quizzes.

5. Seek help from the professor when needed.
6. Follow the principles of honor and community described below.

The professor can be expected to:

1. Create a safe and inclusive environment that follows the principle of community described below.
2. Create a well-organized course that promotes learning of the course objectives.
3. Explain course material clearly and efficiently.
4. Answer student questions thoroughly during class, office hours or through individually scheduled appointments.
5. Create evaluations to comprehensively test mastery of the course material.
6. Grade student work fairly and return it promptly.
7. Follow the principles of honor and community described below.

Principles of Honor: Honesty is the foundation of the academic pursuit of knowledge. In recognition of this, the professors and teaching assistants will not overlook any violations of the [Academic Honor Principle](#). The Faculty of Dartmouth College are **obligated** to report potential violations of the Academic Honor Principle. Further guidance for collaboration on course assessments is provided below.

Principles of Community: We value integrity, responsibility, and respect for the rights and interests of others. We are dedicated to establishing and maintaining a safe and inclusive campus where **all** have equal access to Dartmouth’s educational and employment opportunities. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community. We expect all class participants to act with respect and civility to each other. We encourage students with concerns about classroom climate to talk to your professor, advisor, or Deans.

**COURSE MATERIALS:** The course will use

1. Hole’s Anatomy and Physiology by McGraw Hill is available online for rent or purchase [here](#):
2. Peace is Every Step by Thich Nhat Hanh ISBN13: 9780553351392.

Any student who encounters a financial challenge related to this class should speak to the professor. Additional course material will be posted on Canvas. The professor creates and manages course content for personal use by students. Students are not permitted to publicly share course content including, but not limited to, lecture slides, lecture recordings, problem sets, handouts, or exams. This applies to all or part of course materials. If a student would like to use or post course content outside of the course, please contact your professor for permission.

**LECTURE AND ASSIGNMENT SCHEDULE:**

<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Quiz/Assignment</b>
3/28	<p><i>Icebreaking Activity</i></p> <p><i>Introduction to the Course</i></p> <ul style="list-style-type: none"> <li>○ Structure of Class Meetings</li> <li>○ Class Culture</li> <li>○ Homework &amp; Assessments</li> <li>○ Mindfulness Retreat Attendance</li> </ul> <p><i>What is Mindfulness Practice, where did it come from, and how might it benefit us?</i></p> <ul style="list-style-type: none"> <li>○ Mindfulness origins in Buddhist practice</li> <li>○ Introduction to Mindfulness Practices</li> <li>○ Observed Mindfulness Benefits</li> </ul>	Peace is Every Step	Class Attendance & Daily Practice Logs through 5/30
3/30	<p><i>Introduction to the Study of Physiology</i></p> <ul style="list-style-type: none"> <li>○ Homeostasis</li> <li>○ Unifying Ideas</li> </ul>	Hole’s Chapter 1: Introduction to Human Anatomy and	

	<ul style="list-style-type: none"> <li>○ The Parasympathetic and Sympathetic Nervous System</li> <li>○ Physiological Stress/Relaxation Response</li> <li>○ Keys for Studying</li> </ul>	Physiology; Entire Chapter	
3/31			Written Reflection 1
4/4	<p><i>Following the In and Out Breath: How does breathing sustain life?</i></p> <ul style="list-style-type: none"> <li>○ Cellular Respiration &amp; Photosynthesis</li> <li>○ Respiratory System Anatomy</li> <li>○ Mechanics of Breathing</li> <li>○ Regulation of Ventilation &amp; Circulation</li> <li>○ Effects of Exercise, Stress, Mindfulness on Ventilation &amp; Circulation</li> </ul>	Hole's Chapter 19: Respiratory System; Entire Chapter	
4/6	<p><i>Following the in and out breath continued</i></p>	<p>Hole's Chapter 15: Cardiovascular System; Select Pages</p> <ul style="list-style-type: none"> <li>● Pgs 569-571 (stop at coverings of the heart)</li> <li>● 577: Blood Flow Through the Heart, Lungs, &amp; Tissues</li> <li>● 581-584: Cardiac Conduction System</li> <li>● 584-587: Skim Electrocardiogram &amp; Heart Sounds</li> <li>● 588: Regulation of the Cardiac Cycle</li> <li>● 600-606 Blood Pressure</li> </ul>	
4/7			Written Reflection 2
4/11	<p><i>Following the in and out breath continued</i></p>	Hole's Chapter 19 & selected pages from Chapter 15	
4/13	<p><i>What are special considerations of research with human participants?</i></p> <ul style="list-style-type: none"> <li>○ Ethical considerations</li> <li>○ Participant recruitment and selection bias</li> <li>○ Social desirability effect</li> <li>○ Generalizability of findings</li> </ul>	Course packet 1	Respiration Quiz
4/14			Written Reflection 3
4/18	<p><i>Mindful Eating: Where does the food we consume come from and where does it go?</i></p> <ul style="list-style-type: none"> <li>○ Metabolism of macromolecules</li> <li>○ Digestive System</li> <li>○ Homeostatic and non-homeostatic influences on caloric consumption</li> <li>○ Environmental considerations of food systems</li> </ul>	<p>Hole's Chapter 17: Digestive System; Entire Chapter</p> <p>Hole's Chapter 2: Chemical Basis of Life; Select pages</p> <ul style="list-style-type: none"> <li>● 60-65 Fundamentals of Chemistry</li> </ul>	Study Design Problem Set (PS) 1

		<ul style="list-style-type: none"> <li>• 71-80 Chemical constituents of Cells</li> </ul>	
4/20	<i>Mindful Eating Continued</i>	Hole's Chapters 17 and selected pages from Chapter 2	
4/21	<b>Attendance at 4-hour or 2-day Retreat Required</b>		
4/25	Because of retreat attendance, class time is open		Written Reflection 4
4/27	Because of retreat attendance, class time is open		
4/28			Written Reflection 5
5/2	<p><i>Walking Meditation: How do our bodies control movement and how does movement benefit our health?</i></p> <ul style="list-style-type: none"> <li>○ Nerve innervation of muscles</li> <li>○ Perception of balance and external environment to enable movement</li> <li>○ Cardiovascular response to movement</li> <li>○ Bone de/remineralization</li> </ul>	TBD	Digestion Quiz
5/4	<i>Walking Meditation Continued</i>		
5/5			Written Reflection 6
5/9	<i>Walking Meditation Continued</i>		
5/11	<p><i>How do we evaluate the role of chance in studies?</i></p> <ul style="list-style-type: none"> <li>○ Normal variation and distributions</li> <li>○ Hypothesis testing</li> <li>○ Interpreting confidence intervals</li> <li>○ Interpreting P values</li> <li>○ The importance of replication</li> <li>○ Correlation vs. causation</li> </ul>	Course packet 2	Movement Quiz
5/12			Written Reflection 7
5/16	<p><i>Deep Relaxation: How do internal and external cues signal stress/relaxation, and what is happening in our bodies when we experience feelings of stress/relaxation?</i></p> <ul style="list-style-type: none"> <li>○ Visual and auditory systems</li> <li>○ Endocrine and Nervous System</li> <li>○ Interactions between respiratory, cardiovascular, nervous, and endocrine systems in the stress response</li> <li>○ Impacts of stress on the immune system</li> </ul>	TBD	Study Design PS 2
5/18	<i>Deep Relaxation Continued</i>		
5/19			Written Reflection 8
5/23	<i>Deep Relaxation Continued</i>		
5/25	<p><i>What other sources of error and bias can affect our interpretation of study findings?</i></p> <ul style="list-style-type: none"> <li>○ Intentional/non-intentional misreporting of information by participants and study staff</li> <li>○ Selection bias in participant selection and retention</li> <li>○ Participant compliance</li> <li>○ Confounding</li> <li>○ Mediation</li> <li>○ Strategies to reduce measurement error and bias</li> </ul>	Course packet 3	Relaxation Quiz
5/26			Written Reflection 9, Study Design PS 3 (PS3 Due Fri, not Tues)
5/30	<i>Synthesis and Connections: How do we interact with the world that is in and around us and how can we</i>		Cumulative Quiz

	<i>influence our perceptions of, response to, and effect on the world?</i>		
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**COURSE REQUIREMENTS & GRADING:**

Course Participation: Attendance and active participation by students in this course is essential for optimal learning. Each class session will include ~90 minutes of a lecture/discussion as well as ~20 minutes of a guided mindfulness practice (e.g., following in and out breath, tangerine meditation, silent forest walk, body scan). If you are unable to attend class, please email the professor. For the health and safety of others please do not attend class when you are sick, nor when you have been instructed by Student Health Services to stay home. In addition to focusing during lectures, participating in discussions, and engaging in activities, students are also expected to engage in 15 minutes of daily mindfulness practice. The professor will provide options for several mindfulness practices to choose from, including ones that are self-guided, facilitated by the Student Wellness Center, and facilitated through apps from Headspace and Plum Village. **Students will submit a daily log of their mindfulness practice** and this will contribute towards their class participation grade. Completion of logs, even if <15 practice minutes are recorded, is important for students to assess their own practice habits and will count for credit. Please note that the mindfulness practices offered in this course are not intended to be a substitute for therapy or clinical care. Please see below for student mental health resources.

Students will have the unique opportunity to participate in a retreat with senior Dharma teachers from Thich Nhat Hanh’s Plum Village Community of Engaged Buddhism. As part of the course participation grade, students will be expected to participate in **either** a 4-hour retreat (April 21<sup>st</sup>: 4:00pm-8:00pm) or 2-day retreat (April 22<sup>nd</sup>: 8:00am to April 23<sup>rd</sup>: 4:00pm). There will be no class sessions on 4/25 and 4/27 as an allowance for this time commitment.

Written Reflections: Each week students will write a written response to a prompt to reflect about their own experiences with the assigned mindfulness practices and make connections between their mindfulness practice, the biological concepts covered in the course, and the scientific studies examined. Students are encouraged to discuss their reflections with their classmates but should not share written work and should write their reflections independently.

Quizzes: There will be 5 quizzes to assess students on biological concepts. To encourage mastery of the course material, students will be able to retake each quiz once. Students are not allowed to collaborate on the quizzes.

Study Design Problem Sets: Students will use principles of rigorous scientific inquiry to complete 4 problem sets. Students are encouraged to discuss the problem sets with their classmates but should not share written answers and should write their problem sets independently.

Method of Assessment	Contribution to Final Grade
Class Participation including Practice Logs	20%
Written Reflections	15%
Quizzes	55%
Study Design Problem Sets	10%

Late Policy: Late submissions of practice logs will not be accepted, but students will still receive full credit for a given week (as defined on the google form) if they complete 5/7 of the required logs for weeks 2-9, 3/5 of the logs for week 1, and 2/3 of the logs for week 10; there is no need to contact the Professor in those circumstances. Late submissions of written reflections and problem sets will be penalized 10% for each 24-hour period (or part thereof). Requests for extensions must be provided to the professor in writing for evaluation and decision.

**STUDENT RESOURCES:**

Student Accessibility and Accommodations:

Students requesting disability-related accommodations and services for this course are required to register with Student Accessibility Services (SAS; Getting Started with SAS webpage; student.accessibility.services@dartmouth.edu; 1-603-646-9900) and to request that an accommodation email be sent to me in advance of the need for an accommodation. Then, students should schedule a follow-up meeting with me to determine relevant details such as what role SAS or its Testing Center may play in accommodation implementation. This process works best for everyone when completed as early in the quarter as possible. If students have questions about whether they are eligible for accommodations or have concerns about the implementation of their accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

Religious Observances: Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your course participation, please contact the professor as early in the term as possible to discuss appropriate accommodations.

Sexual Respect Resources: The Title IX Office at Dartmouth provides a wealth of information on students' rights with regard to sexual respect and resources that are available to all in our community. Please note that faculty members are obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator (Kristi.Clemens@Dartmouth.edu)

Mental Health Resources: The academic environment at Dartmouth can be challenging, terms can be intensive, and classes may not be the only demanding part of life. There are a number of resources available to you on campus to support your wellness, including: the Counseling Center which allows you to book triage appointments online, the Student Wellness Center which offers wellness check-ins, and your undergraduate dean. The student-led Dartmouth Student Mental Health Union and their peer support program may be helpful if you would like to speak to a trained fellow student support listener. If you need immediate assistance, please contact the counselor on-call at (603) 646-9442 at any time. Please make me aware of anything that will hinder your success in this course.

**CONSENT TO RECORD:**

(1) Consent to recording of course meetings and office hours that are open to multiple students.

By enrolling in this course,

a) I affirm my understanding that the instructor may record meetings of this course and any associated meetings open to multiple students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, within any digital platform, including those used to offer remote instruction for this course.

b) I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and my distribution of any of these recordings in whole or in part to any person or entity other than other members of the class without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including separation from Dartmouth.

(2) Requirement of consent to one-on-one recordings

By enrolling in this course, I hereby affirm that I will not make a recording in any medium of any one-on-one meeting with the instructor or another member of the class or group of members of the class without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including separation from Dartmouth, as well as any other civil or criminal penalties under applicable law. I understand that an exception to this consent applies to accommodations approved by SAS for a student's disability, and that one or more students in a class may record

class lectures, discussions, lab sessions, and review sessions and take pictures of essential information, and/or be provided class notes for personal study use only.

If you have questions, please contact the Office of the Dean of the Faculty of Arts and Sciences.