Biol 212: Nutritional Physiology

Spring 2023 (2645)
Lecture (Park 159): MWF 10:10AM – 11:00 AM

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Office hours: M 12:10-1PM
and by appointment

Inside this syllabus

Welcome to Nutritional Physiology!

Have you ever wondered what happens to food when you eat it? What the different parts of your intestines do? What the deal is with fructose? We'll be covering nutrition from energy and basic thermodynamics to macronutrients and vitamins all the way to how history and capitalism have shaped food policy and availability on global scales.

Course Goals

Below are a few goals to focus on as we progress throughout the course. These are the big ideas that you should walk away with and hold on to by the time class is over. Specifically, at the end of this course, you should be able to:

- Explain why animals need to eat
- Describe the fate of food from ingestion to nutrient use or waste
- Predict metabolic responses to changes at the cellular to whole organism levels
- Recognize the form and function of digestive and accessory organs
- Appreciate the role of gut symbionts
- Explain the controls for hunger and satiety, nutrient and energy storage and mobilization, and the physiology of fed and fasted states
- Discuss food supply, processing, availability, policy, and the influence of social values and structures

Course Materials

Textbook: Nutrition and Metabolism, by David Bender
The 4th edition is available in the bookstore for ~$20. Please let me know if this is a hardship. We will primarily be using the book as study material and there will likely not be required readings from this text.

Other materials: I will be assigning several research articles, essays, and podcast episodes. For the written materials, I will provide you with the article. I will be assigning several episodes of the podcast "Maintenance Phase" by Michael Hobbes and Aubrey Gordon (https://www.maintenancephase.com/). Written transcripts of the episodes are available on the website.

Course Structure and Components

Lecture: I will make lecture slides available as PDFs by the start of each lecture. When possible, lectures will be auto captioned in real time. Please let me know if this does not align with your needs. I will record all lectures and post them on Moodle the same day. At some point in the semester, I may record a supplemental lecture outside of our normal meeting time with the expectation that you will review it before our next class.

Alternating Wednesdays, class will be devoted to discussing material assigned the week before. Attendance and participation are required on these days.

Material covered: I intend to be transparent about what material you I expect you to know when being assessed in this course. Each lecture will start with a list of learning goals and a week before each exam, I will provide you with a list of the terms I expect you to know.

I am most interested in you learning and thinking about nutritional physiology, not necessarily learning at a certain speed. I'll do my best to observe your progress and give feedback and assistance, but I will appreciate your self-awareness and open communication to ask for what you need from me and the class.

Assignments:

- **Introduction Survey**: When semester begins, I'll ask you to fill out a survey about yourself, your learning, and your goals. It will really help you, me, and the class for you to do it. You will get 10 points for completing the survey.

- **Discussion contributions**: Alternating Wednesdays, we will have whole class or small group discussions of material assigned the week before. These will not be recorded. Before class, you will be expected to read / consume the material and write a short summary (~a paragraph) of what you got from it and note what you did not understand (5 pts). Write out three questions, opinions, or discussion points that you would like to address in conversation (3 pts). During class, actively engage in discussion on the topic (8 pts). After class, write a sentence or so on what you got out of the discussion (4 pts). I will collect your pre- and post-discussion notes. (They can just be notes, no special format.)

- **Homework**: There will be five homework assignments consisting mainly of in-depth practice problems pertaining to the previous two-week's lectures. Each homework will be out of 30 points.

- **Project**: I will be assigning a project that will require research into nutrition literature for practical application. I will provide more information about the project later in the term. I will be worth 175 points.

- **Exams**: There will be one midterm exam (150 pts) and one final exam (350 pts) to assess your knowledge and mastery of the course material using a variety of question formats. I will post a study-guide a week before each exam opens. The exam will be self-scheduled or take-home and will be available for a week. You will receive up to 25 points for **self-grading** your midterm after the key is posted. The final exam will be cumulative, but with heavier focus on material covered since the midterm. The final will have some question types similar to those on the midterm, but also may include some more integrative synthesis questions.

Learning Objectives: I value being clear and transparent generally. At the beginning of every day of class, I will present learning objectives that clearly state what I expect you to be able to do. (Let me know if it isn't clear!) Learning objectives are things that you can actually DO, so you will be able to tell whether or not you really know the material. Learning objectives come in all levels, from the very basic to the very complex, and you will be challenged at all levels in this course.

Grading Breakdown

Introduction survey	1%	10 points	
Discussion contribution	14%	140 points	(7 at 20 pts each)
Homework	15%	150 points	(5 at 30 pts each)
Midterm	15%	150 points	
Self-grading	2.5%	25 points	
Project	17.5%	175 points	
Final exam	35%	350 points	
Total	**100.0%**	**1000 points**	

The number of points will be converted to grades based on the following scale. NOTE: The grading scale is subject to change at the discretion of the instructor and will not be considered final until all assignments have been completed.

4.0	925 – 1000 points	2.7	795 – 824 points	1.3	655 – 694 points
3.7	895 – 924 points	2.3	755 – 794 points	1.0	600 – 654 points
3.3	855 – 894 points	2.0	725 – 754 points	0	Less than 599 points
3.0	825 – 854 points	1.7	695 – 724 points		

Course Policies

Courtesy to Fellow Students: I'd like to have a positive learning environment in this class where we have the space to succeed, fail, be vulnerable, and be genuine. If something is distracting or detrimental to your learning, let's shift course policies to make the environment work for you. Courtesy to your fellow students and to me is imperative—with a caveat. Because we will often be talking about human experiences and bodies, I'd like to acknowledge that experiences and identities that have been marginalized by dominant power structures can be further harmed by insisting on civility when experiencing or pushing back against harm being done. As an easter egg to that you've read this, please send me your favorite food meme by 1/21 for an extra credit point. However, I am committed to assuming best intentions and treating this as a learning space—please do the same with me and with each other and keep communication open.

If any of my actions are harmful to you or a community you're knowledgeable about, I would like to know. I intend to respond with gratitude and take action to fix the problem. If this constitutes you doing substantial labor in relation to marginalized status (e.g. gendered, racial, disability), let's discuss how I can appropriately recognize that labor.

Attendance and Recording: While attending lecture will enrich both yours and the rest of the class's experience of the material, I want you to do what is best for your health and learning. I intend to record each lecture and make it available. Do note that this means that you may be recorded while in class. I will make sure to get your permission explicitly in writing, but until then, this serves as your notice. Alternating Wednesdays' discussions will not be recorded.

If you are not feeling well and either need to take care of yourself or may be contagious to others, please do not come to class. While we will be taking precautions to mitigate spread of infectious disease, avoiding exposure is ideal. If your ailment is not contagious, please act in the way that is best for your overall wellbeing. In either case, please contact me so we can work out makeup/ alternate options.

Late Work: I recommend turning work in on time. If you will be turning in your work outside of the expected timeframe, please keep me updated so I can appropriately budget my time to respond to it. I reserve the right to subtract points for late work, but I very much do not want to use point subtraction as a punitive tool. I would rather your grade be a reflection of your mastery of the material. I will not be able to accept work after the last day of class without us both jumping through administrative hoops.

Getting Help Outside of Class: I will hold an office hour on Mondays from 12:10-1PM during which I will be available in Park 219 and on zoom. I am open to appointments at other times. You may come ask questions, listen, or chat about course, professional, or college relevant topics.

If possible, don't ask content questions via email but instead post on the Moodle Discussions board where you can benefit from your classmates' input, clarify their questions, or alert me that a concept was tricky for most of the class.

Policy on Health and Accommodations: Bryn Mawr College is committed to providing equal access to students with a documented disability. Students needing academic accommodations for a disability must first register with Access Services. Students can call 610-526-7516 to make an appointment with the Director of Access Services, Deb Alder, or email her at ***dalder@brynmawr.edu*** to begin this confidential process. Once registered, students should schedule an appointment with me as early in the semester as possible to share the verification form and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement. More information can be obtained at the Access Services website. (***http://www.brynmawr.edu/access-services/***).
Haverford Students: Haverford College is committed to providing equal access to students with a disability. If you have (or think you have) a learning difference or disability – including mental health, medical, or physical impairment – please contact the Office of Access and Disability Services (ADS) at hc-ads@haverford.edu. The Director will confidentially discuss the process to establish reasonable accommodations. Students who have already been approved to receive academic accommodations and want to use their accommodations in this course should share their verification letter and make arrangements to meet with me as soon as possible to discuss their accommodations. Please note that accommodations are not retroactive and require advance notice to implement.

If you suspect you would benefit from accommodations but are not yet registered, I am happy to talk to you about the process and your options. If you notice that something in class could be more accessible (whether it directly affects you or not), I'd like to know!

If you are sick and contagious, I ask that you not attend class (to protect your classmates from your microbes) and contact me for potential arrangements as soon as possible. To accommodate my health needs, I ask for you not to wear strongly scented colognes, perfumes, lotions, etc. to lecture, lab, or my office hours.

Masking Policy and Ventilation: Masks are required in this class (in lecture, my office). Please wear a well fitted N95, equivalent (e.g. KN95, KF94), or better (e.g. P100, R100) rated mask that covers your nose and mouth with no gaps. If you are not wearing a mask when you arrive at class, I will provide you with one (likely a 3M V-flex).

If your mask has slipped or is not fitting well, expect that I will bring it to your attention. **If you need to remove your mask** (e.g. to drink water, eat, readjust), **you must exit the classroom** and preferably go outside until you put your mask back on. We'll make sure that doesn't cause anyone to miss any course material!

If you wear a respirator with an exhaust valve, please filter your outgoing air. I am happy to help with solutions for that.

I intend to have a HEPA air purifier running in our classroom.

Policy on Children in Class: While I have a standing policy on children in class for when there is not an active pandemic, it may not be tenable at this time. I encourage you to talk with me about what needs you may have in this area so that we may find the best solution.

Life: Pretty much, if it would help you succeed in this class, let me know and I'll see what I can do.

Academic integrity: It is expected that all students in this course will uphold the honor code which demands that each student live with integrity and discretion in their own life. All exams submitted by students should be of your own hard work and knowledge. Homework and the mysteriously vague project may benefit from collaboration—however if you work with others, please balance the labor and make sure your contribution reflects having done the work to learn and think. As the honor code states: At the heart of growth is the process of learning!

Actually, it does hurt to ask: The grading scale for the course is fixed-- please do not ask me to alter it. I realize that grades can be very important to many students. If you have a grade you're aiming for, it is your responsibility to earn it. I am happy to help you meet your goals and brainstorm learning strategies throughout the course. If you find a grading error on any of your assignments, it is your responsibility to let me know as soon as possible. However, if you ask to have your grade changed (outside of a grading error), I will automatically subtract up to 10 points for the first infraction (and up to 20 for any subsequent infractions).

Course Schedule & Topics
Schedule and topics both subject to change
The following is the general schedule for the course.

	Date		In class	Assigned/Due
Week 1	Wed	Jan 18	Lecture 1	
	Fri	Jan 20	Syllabus and logistics	
Week 2	Mon	Jan 23	Lecture 2	
	Wed	Jan 25	Discussion 1	Homework 1 assigned
	Fri	Jan 27	Lecture 3	
Week 3	Mon	Jan 30	Lecture 4	
	Wed	Feb 1	Lecture 5	Homework 1 due
	Fri	Feb 3	Lecture 6	
Week 4	Mon	Feb 6	Lecture 7	
	Wed	Feb 8	Discussion 2	Homework 2 assigned
	Fri	Feb 10	Lecture 8	
Week 5	Mon	Feb 13	Lecture 9	
	Wed	Feb 15	Lecture 10	Homework 2 due
	Fri	Feb 17	Lecture 11	
Week 6	Mon	Feb 20	Lecture 12	
	Wed	Feb 22	Discussion 3	
	Fri	Feb 24	Lecture 13	
Week 7	Mon	Feb 27	Lecture 14	Midterm posted (lectures 1-13)
	Wed	Mar 1	Lecture 15	
	Fri	Mar 3	Lecture 16	
Spring break	Mon	Mar 6		Midterm due
Week 8	Mon	Mar 13	Lecture 17	
	Wed	Mar 15	Discussion 4	Homework 3 assigned
	Fri	Mar 17	Lecture 18	
Week 9	Mon	Mar 20	Lecture 19	
	Wed	Mar 22	Lecture 20	Homework 3 due
	Fri	Mar 24	Lecture 21	
Week 10	Mon	Mar 27	Lecture 22	
	Wed	Mar 29	Discussion 5	Homework 4 assigned
	Fri	Mar 31	Lecture 23	
Week 11	Mon	Apr 3	Lecture 24	
	Wed	Apr 5	Lecture 25	Homework 4 due
	Fri	Apr 7	Lecture 26	
Week 12	Mon	Apr 10	Lecture 27	
	Wed	Apr 12	Discussion 6	Homework 5 assigned
	Fri	Apr 14	Lecture 28	
Week 13	Mon	Apr 17	Lecture 29	
	Wed	Apr 19	Lecture 30	Homework 5 due
	Fri	Apr 21	Lecture 31	
Week 14	Mon	Apr 24	Lecture 32	
	Wed	Apr 26	Discussion 7	
	Fri	Apr 28	Lecture 33	
Finals week	Mon	May 1		Final assigned (cumulative)

These are the general topics I expect to cover, and the approximate order.

- Why eat?
- Chemistry of energy
- Biochemistry of energy metabolism
- Energy storage and loss
- Metabolic rate
- Digestion
- Digestive organs and accessory organs
- Gut functions
- Mechanisms of protein, carbohydrate, and lipid digestion
- Gut secretions and motility
- Microbiomes
- Potential controls of feeding and satiety
- Nutrient fates
- Fed vs. fasted states
- Fatty acid synthesis and metabolism
- Protein catabolism and turnover
- Nitrogen metabolism
- Shifts in food and diet regulations and guidelines
- Food supply
- Carbohydrate metabolism
- Movement and energy
- Vitamins
- Minerals
- Intake rates
- Cooking and food preparation
- Agricultural practices, regulations, lobby, and legislation
- Stable isotopes and diet tracing
- Malnutrition
- Fatphobia
- Food justice