

BISC 438 Nutritional Biochemistry (4 Units)
2019 Fall Semester
Syllabus

Day/Time: Monday, Wednesday, and Friday 3:00 - 3:50pm

Location: VHE 210

Instructor: Grayson Jagers, PhD

Office: 256 ZHS

Office Hours: Mondays 1-2:30pm

Email: jagers@usc.edu

Course Description and Learning Objectives

We all understand that the carbohydrates, proteins, and fats we consume provide our bodies with energy, but there are biologically-active nutritional chemicals that do not provide energy. What roles do these molecules serve in our body? By what mechanisms do they impact our health? These are the questions that we will address throughout this course.

Topics covered include, amino acid metabolism, lipid synthesis, and the metabolic functions of vitamins and minerals. The course will also explore the functions of biologically-active non-nutrients such as caffeine and phytochemicals. This course will reinforce the principles taught in BISC 330, and expand upon them as students learn the biochemical basis of nutrition's impact on metabolic functions. In addition to increasing the understanding of nutritional impact on human biochemistry, the course aims to improve the student's critical thinking skills.

The class will consist of a mixture of lecture and discussion. The goal of the discussion is to review the topics covered in lecture and do so in an engaging manner. Students will be required to apply the concepts discussed in lecture to work through problem sets provided.

Prerequisite: BISC 330L (Biochemistry), or BISC 312 (Molecular Biochemistry)

I. Textbook (Optional)

Stipanuck, Martha H., Caudill, Marie A. Biochemical, Physiological, and Molecular Aspects of Human Nutrition (3rd Edition, 2012).

II. Description and Assessment of Assignments

Exams will be based upon concepts discussed in lectures. Any information presented outside of lecture will not be tested upon, unless specifically stated.

Homework will be due at the beginning of class on their respective due dates. Late work will not be accepted.

III. Grading Breakdown

The course grade will be based upon three lecture exams, ten homework assignments, and participation in ten discussion section meetings. Each exam will be worth 100 points. Each homework assignment will be worth a total of 10 points.

Midterm 1: 100 points

Midterm 2: 100 points

Final Exam: 100 points

Homework (10 x 10 points): 100 points

Total: 400 points

Attendance: Discussion and exam attendance is mandatory, and there are no make-up test or assignments. The only exceptions to this policy are for those who have a medical emergency (stuffy noses don't count), in which case proper documentation will be required. Also, if you are a member of a university club or athletic team, and you know in advance that you cannot attend a specific meeting, please let the instructor know as soon as possible.

Final Exam Date and Time: Monday, December 16th 2-4pm

IV. Tentative Lecture Schedules (Subject to change)

Week	Date	Topic
1	26-Aug	Intro to Nutritional Biochemistry, Review of Glycolysis and β -oxidation
	28-Aug	Digestion and Absorption
	30-Aug	Digestion and Absorption of Carbohydrates and Protein
2	2-Sep	Labor Day
	4-Sep	Lipid Digestion and Absorption
	6-Sep	Problem Set 1
3	9-Sep	Amino Acid Metabolism I
	11-Sep	Amino Acid Metabolism II
	13-Sep	Lipid Metabolism
4	16-Sep	Problem Set 2
	18-Sep	Cholesterol Synthesis and Metabolism
	20-Sep	Fuel Regulation
5	23-Sep	Energy Balance
	25-Sep	Problem Set 3
	27-Sep	Midterm 1
6	30-Sep	Water-Soluble Vitamins - Niacin
	2-Oct	Water-Soluble Vitamins - Riboflavin & Thiamin
	4-Oct	Water-Soluble Vitamins - Folate and Choline
7	7-Oct	Problem Set 4
	9-Oct	Water-Soluble Vitamins - Vitamin C
	11-Oct	Fat-Soluble Vitamins - Vitamin E
8	14-Oct	Problem Set 5
	16-Oct	Fat-Soluble Vitamins - Vitamin K
	18-Oct	Fall Recess
9	21-Oct	Fat-Soluble Vitamins - Vitamin A
	23-Oct	Problem Set 6
	25-Oct	Fat-Soluble Vitamins - Vitamin D
10	28-Oct	Mineral Metabolism - Calcium
	30-Oct	Problem Set 7
	1-Nov	Midterm 2
11	4-Nov	Mineral Metabolism - Iodine
	6-Nov	Mineral Metabolism - Iron
	8-Nov	Water Balance
12	11-Nov	Problem Set 8
	13-Nov	Alcohol Metabolism
	15-Nov	Polyphenols I
13	18-Nov	Polyphenols II
	20-Nov	Polyphenols III
	22-Nov	Problem Set 9
14	25-Nov	Phytosterols and Phytoestrogens
	27-Nov	Thanksgiving Weekend
	29-Nov	Thanksgiving Weekend
15	2-Dec	Alkaloids
	4-Dec	Problem Set 10
	6-Dec	Review for Final

V. Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

VI. Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

VII. Academic Integrity Violations

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the University. Since dishonesty in any form harms the individual, other students and the University, academic integrity policies will be strictly enforced.

VIII. Disruptive and Threatening Behavior

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* (<http://equity.usc.edu/>) or to the *Department of Public Safety* (<http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>). This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* (<http://www.usc.edu/student-affairs/cwm/>) provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.