

BISC 438 Nutritional Biochemistry (4 Units)
2018 Spring Semester
Syllabus

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

*The four weekly meetings will consist of three lecture days, and one day for homework question and lecture reviews.

Location: THH 110

Discussion Location: THH 110

Instructor: Dr. Grayson Jaggers, PhD

Office: 256 ZHS

Office Hours: Tuesday 1-2:30 pm

Email: jaggers@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.

Along with lectures, students will attend weekly discussions. The goal of the discussion is to review the topics covered in lecture, and doing so in an engaging manner. Students will be required to apply the concepts discussed in lecture to solve problems through a weekly set of questions that will be due in each discussion section. The discussion section will also serve as a time for review session for the three lecture exams.

Prerequisite: BISC 330L (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 assigned weekly and due at each discussion meeting.

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: Friday May 4, 2-4pm

IV. Tentative Lecture Schedules (Subject to change)

Lecture Schedule		
Week	Date	Topic
1	8-Jan	Intro to Nutritional Biochemistry
	10-Jan	Review of Glycolysis, β -oxidation
	12-Jan	Digestion and Absorption
2	15-Jan	MLK Day
	17-Jan	Protein Metabolism
	19-Jan	Amino Acid Metabolism
3	22-Jan	Amino Acid Metabolism
	24-Jan	Lipid Synthesis and Metabolism
	26-Jan	Lipid Synthesis and Metabolism
4	29-Jan	Cholesterol Synthesis and Metabolism
	31-Jan	Cholesterol Synthesis and Metabolism + F49
	2-Feb	Energy Balance
5	5-Feb	Energy Balance
	7-Feb	Water-Soluble Vitamins: Niacin, Riboflavin
	9-Feb	Water-Soluble Vitamins: Choline, Thiamin
6	12-Feb	Midterm
	14-Feb	Water-Soluble Vitamins: Folate, B12
	16-Feb	Water-Soluble Vitamins: B6, Biotin
7	19-Feb	President's Day
	21-Feb	Water-Soluble Vitamins: Pantothenic Acid, F19 Vitamin C
	23-Feb	Fat-Soluble Vitamins: Vitamin K, E
8	26-Feb	Fat-Soluble Vitamins: Vitamin A, D
	28-Feb	Mineral Metabolism: Calcium and Phosphate
	2-Mar	Mineral Metabolism: Magnesium
9	5-Mar	Mineral Metabolism: Sodium, Potassium, and Chloride
	7-Mar	Mineral Metabolism: Iron
	9-Mar	Mineral Metabolism: Zinc, Copper, Manganese
10		Spring Recess
11	19-Mar	Mineral Metabolism: Selenium and Fluoride
	21-Mar	Mineral Metabolism: Iodine
	23-Mar	Trace Elements
12	26-Mar	Midterm
	28-Mar	Regulation of Water Balance
	30-Mar	Alcohol Metabolism
13	2-Apr	Alcohol Metabolism
	4-Apr	Plant Sterols
	6-Apr	Plant Sterols
14	9-Apr	Phytoestrogen
	11-Apr	Phytoestrogen
	13-Apr	Polyphenolic Compounds
15	16-Apr	Polyphenolic Compounds
	18-Apr	Polyphenolic Compounds
	20-Apr	Polyphenolic Compounds
16	23-Apr	Lectins
	25-Apr	Alkaloids
	27-Apr	Alkaloids

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/departement-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/departments/departments-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.