BISC 438 Nutritional Biochemistry (4 Units)
2024 Fall Semester
Syllabus

Day/Time: Monday, Wednesday, and Friday 2:00 - 2:50 PM
Location: VHE 206

Instructor: Grayson Jaggers, PhD
Office: ZHS 256
Office Hours: TBD
Email: jaggers@usc.edu (Please allow 24 hours for a response)

Course Description

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.

The class will consist of a mixture of lecture and in-class discussion. 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 330/312, and expand upon them as students learn the biochemical basis of nutrition's impact on metabolic functions.

Learning Objectives

After completion of homework, in-class discussions and examinations, students should be able to effectively execute the following:

1. Clear written communication of complex concepts in biochemistry.
2. Compare and contrast biochemical regulatory mechanisms.
3. Establish connections between the metabolism of various nutrients.
4. Establish connections between nutrient metabolism and nutrition-based diseases.

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

I. Textbook (Optional)

Stipanuck, Martha H., Caudill, Marie A. Biochemical, Physiological, and Molecular Aspects of Human Nutrition (4th Edition, 2019).

II. Description and Assessment of Assignments

Exams are typically 30% multiple-choice, and 70% written response. They will be based upon concepts discussed in lecture and homework. Any information presented outside of lecture or homework assignments will not be tested upon, unless specifically stated.

Homework contains problems that require a written response. Homework that receives full credit will be turned in before the beginning of class, and contains well-reasoned and accurate responses to the questions. Late homework will not be accepted. Exceptions can be made for students under certain circumstances.

III. Grading Breakdown

The course grade will be based upon four lecture exams and homework. Each exam will be worth 100 points (21.7% of the overall grade). There are six homework assignments worth 10 points each (totaling 13% of the overall grade).

Midterm 1: 100 points
Midterm 2: 100 points
Midterm 3: 100 points
Final Exam: 100 points
Homework: 60 points
Total: 460 points

Typical Grade Breakdown (Just to give you an idea, but not guaranteed)*:*
A range: 85-100% B range: 70-84% C range: 60-69%

Attendance: Exams must be taken during the scheduled class period. Attendance in lecture is not required, but is recommended, as we will be reviewing homework as well as going over lecture material.

IV. Tentative Lecture and Exam Schedule

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	Amino Acid Metabolism I
3	9-Sep	Amino Acid Metabolism II
	11-Sep	Lipid Metabolism
	13-Sep	Cholesterol Synthesis and Metabolism
4	16-Sep	**Homework Discussion**
	18-Sep	**Midterm 1**
	20-Sep	Fuel Regulation and Energy Balance
5	23-Sep	Water-Soluble Vitamins - Niacin
	25-Sep	Water-Soluble Vitamins - Riboflavin & Thiamin
	27-Sep	Water-Soluble Vitamins - Folate
6	30-Sep	Water-Soluble Vitamins - Choline
	2-Oct	Water-Soluble Vitamins - Vitamin C
	4-Oct	Fat-Soluble Vitamins - Vitamin E
7	7-Oct	Fat-Soluble Vitamins - Vitamin K
	9-Oct	**Homework Discussion**
	11-Oct	**Fall Recess**
8	14-Oct	**Midterm 2**
	16-Oct	Fat-Soluble Vitamins - Vitamin A
	18-Oct	Fat-Soluble Vitamins - Vitamin D
9	21-Oct	Mineral Metabolism – Calcium
	23-Oct	Mineral Metabolism - Iron
	25-Oct	**Homework Discussion**
10	28-Oct	Mineral Metabolism - Iodine
	30-Oct	Water Balance
	1-Nov	Alkaloids
11	4-Nov	Alkaloids
	6-Nov	**Homework Discussion**
	8-Nov	**Midterm 3**
12	11-Nov	**Veteran's Day**
	13-Nov	Alcohol Metabolism
	15-Nov	Polyunsaturated Fatty Acids
13	18-Nov	Polyphenols
	20-Nov	Polyphenols
	22-Nov	**Homework Discussion**
14	25-Nov	Polyphenols
	27-Nov	**Thanksgiving Break**
	29-Nov	**Thanksgiving Break**
15	2-Dec	Phytosterols
	4-Dec	Phytoestrogens
	6-Dec	**Homework Discussion**

Final Exam: Friday, December 13th, 2-4PM

VI. Statement on Academic Conduct and Support Systems

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 Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. 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.

Support Systems:
Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline *– 1 (800) 273-8255*
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services *(RSVP) – (213) 740-4900 – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance *– (213) 740-5086*
Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy *– (213) 821-4710*
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety *– UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.*
Provides overall safety to USC community. dps.usc.edu

End-of-Semester Evaluations
I value your thoughts on the course, and myself, as your instructor. At the end of the semester, please take time to complete the course and instructor evaluations. I am always trying to improve the course, and this is a great way for me to utilize your insight.