

Keck School of Medicine of USC

BIOC 511: Foundations for Molecular Medicine

Units: 4 units

Term–Day–Time: Fall 2021, Mon,Wed 6:00 PM-7:50 PM

Location: McKibben Hall (MCH) 256

Course Coordinator(s):

Name: Baruch Frenkel Contact: frenkel@usc.edu

Office: Office Hours: By Appointment

Course Instructor(s):

Name: Mark Frey Contact: mfrey@chla.usc.edu

Office: Office Hours: By Appointment

Name: Vijay Kalra Contact: vkalra@usc.edu

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Name: Sita Reddy Contact: sitaredd@usc.edu

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Name: Bangyan Stiles Contact: bstiles@usc.edu

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Name: Jian Xu Contact: xujian@usc.edu

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Teaching Assistant(s):

Name: Perna Sehgal

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Course Description

BIOC 511, Foundations for Molecular Medicine, is specifically designed for first-year Master's students in the Biomedical Sciences. The course enables students to comprehend concepts in the fields of Biochemistry and Cell Biology, as they pertain to biomedical investigation of human disease. The course is designed with ample iterations, to cater in particular to international students, for whom this may be the first educational experience in the US. Topics include the structure, function and metabolism of nucleic acids, proteins, carbohydrates and lipids, as well as related regulatory mechanisms including transcription factors and upstream signaling pathways initiated at the cell membrane. Lectures include examples of relevance to human diseases and their treatment. While this course is open to any MS or PhD student at USC, it is required of all first year students in the Master's degree program in the Department of Biochemistry and Molecular Medicine (BMM). Topics in Biochemistry and Cell Biology were carefully selected to maximize relevance to research thesis projects typically carried out by

Master's students in the program.

Learning Objectives

Upon completion of the course, students will be able to:

1. Explain the physiological function of components of major biochemical pathways in human biology.
2. Give examples for deregulation of major biochemical pathways in human disease.

Prerequisite(s):

Co-Requisite(s):

Concurrent Enrollment:

Recommended Preparation:

Teaching & Assessment Methods

Teaching Methods

- Assigned reading/writing (texts)
- Classroom lecture
- Reflection

Assessment Methods

- Essay
- Oral presentation

Course Notes

Communication

Lectures and review sessions will be delivered via Zoom.
Course material will be posted on Blackboard ahead of each class.

Homework assignments will be submitted through Blackboard.

Technological Proficiency and Hardware/Software Required

Students should be familiar with Blackboard. Proficiency with Zoom is also required.

Required Materials

- Links to videos and text files will be posted in Blackboard. They must be studied and summarized by each student. The summary must be posted in Blackboard prior to the respective class.

Optional Materials

- Lodish et al. (Eds.) Molecular Cell Biology, 6th edition

Description and Assessment of Assignments

Student will study video and text files before most lectures. Each student will post on Blackboard a few slides summarizing what they consider to be the most important information. Assigned student(s) will present their summary to the class at the session.

Grading Breakdown

Assignment	% of Grade
Pre-class assignments (posted in Blackboard)	20
Presentation of pre-class assignments (in Class)	20
Mid-term Exam	30
Final Exam	30
Total	100

Grading Scale

Course final grades will be determined using the following scale.

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Course-specific Policies

Assignment Submission

Pre-class assignments must be posted in Blackboard prior to each class for which such assignments are due.

Assigned students will present their pre-class assignments to the entire class and will entertain questions and discussion.

Grading Timeline

Late work

Satisfactory assignments posted on time in Blackboard will award the student full credit. Late submission of a satisfactory assignment will award the student 50% credit.

Technology in the classroom

Academic integrity

A grade of zero will be applied to submitted work that does not comply with the USC standards of academic conduct. Such work may not be resubmitted for a new grade. Academic integrity is included at the end of the syllabus.

Attendance

Please contact the course coordinator or the TA if you cannot attend any of the Zoom sessions.

Classroom norms

To facilitate effective communication, it is desirable that Zoom participants are visible via their

computer camera.

Expectations on Student Engagement

All students will post pre-class assignments in Blackboard.

Assigned students will present the assignment to the entire class.

Presenting students will entertain questions and comments from the class.

Course evaluation

Policy on Learning & Assessment Feedback (LAF)

Feedback on examinations will be provided using the following methods. Please indicate which method(s) you will use in the course.

- Complete examination will be returned and a key will be made available

Course Schedule: A Weekly Breakdown

Date	Topic	Lecturer
Mon 08/23/21 06:00p - 07:50p	1) Introduction to course 2) Nucleotide metabolism	Baruch Frenkel
Wed 08/25/21 06:00p - 07:50p	Nucleic acids structure and function	Baruch Frenkel
Mon 08/30/21 06:00p - 07:50p	DNA replication	Sita Reddy
Wed 09/01/21 06:00p - 07:50p	DNA damage, repair, modifications	Sita Reddy
Wed 09/08/21 06:00p - 07:50p	Transcription and its regulation (I)	Judd Rice
Mon 09/13/21 06:00p - 07:50p	Transcription and its regulation (II)	Judd Rice
Wed 09/15/21 06:00p - 07:50p	RNA processing, transport and degradation	Sita Reddy

Mon 09/20/21 06:00p - 07:50p	Translation	Baruch Frenkel
Wed 09/22/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Baruch Frenkel Sita Reddy Judd Rice
Mon 09/27/21 06:00p - 07:50p	Carbohydrate Metabolism and Diabetes	Vijay Kalra
Wed 09/29/21 06:00p - 07:50p	Bioenergetics and mitochondria	Vijay Kalra
Mon 10/04/21 06:00p - 07:50p	Lipid metabolism: Fatty acids, phospholipids, gangliosides and Tay-Sachs disease	Vijay Kalra
Wed 10/06/21 06:00p - 07:50p	Cholesterol, lipoproteins and atherosclerosis	Vijay Kalra
Mon 10/11/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Vijay Kalra
Wed 10/13/21 06:00p - 07:50p	Midterm Exam	Baruch Frenkel
Mon 10/18/21 06:00p - 07:50p	Protein Structure	Ansgar Siemer
Wed 10/20/21 06:00p - 07:50p	Experimental approaches to protein structure	Ansgar Siemer
Mon 10/25/21 06:00p - 07:50p	Enzymes	Mark Frey
Wed 10/27/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Ansgar Siemer Mark Frey
Mon 11/01/21 06:00p - 07:50p	1) Introduction to Cell Signaling 2) Nuclear Hormone Receptor Family	Baruch Frenkel
Wed 11/03/21 06:00p - 07:50p	G protein-coupled receptors	Baruch Frenkel
Mon 11/08/21 06:00p - 07:50p	PI3-kinase and PTEN	Bangyan Stiles
Wed 11/10/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Baruch Frenkel Bangyan Stiles
Mon 11/15/21 06:00p - 07:50p	1) Receptor tyrosine kinases 2) Cytokine signaling	Baruch Frenkel

Wed 11/17/21 06:00p - 07:50p	BMP/TGF β signaling	Jian Xu
Mon 11/22/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Baruch Frenkel Jian Xu
Mon 11/29/21 06:00p - 07:50p	Wnt, Hedgehog, NF κ B, Notch signaling	Baruch Frenkel
Wed 12/01/21 06:00p - 07:50p	Cancer	Baruch Frenkel
Mon 12/06/21 06:00p - 07:50p	CATCH UP and REVIEW SESSION	Baruch Frenkel
Wed 12/08/21 06:00p - 07:50p	Final Exam	

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