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):
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Course Instructor(s):
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Teaching Assistant(s):
Name: Prerana Sehgal
Contact Info: psehgal@usc.edu

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**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-class assignments (posted in Blackboard)</td>
<td>20</td>
</tr>
<tr>
<td>Presentation of pre-class assignments (in Class)</td>
<td>20</td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>30</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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</tbody>
</table>

**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
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 08/23/21 06:00p - 07:50p</td>
<td>1) Introduction to course  2) Nucleotide metabolism</td>
<td>Baruch Frenkel</td>
</tr>
<tr>
<td>Wed 08/25/21 06:00p - 07:50p</td>
<td>Nucleic acids structure and function</td>
<td>Baruch Frenkel</td>
</tr>
<tr>
<td>Mon 08/30/21 06:00p - 07:50p</td>
<td>DNA replication</td>
<td>Sita Reddy</td>
</tr>
<tr>
<td>Wed 09/01/21 06:00p - 07:50p</td>
<td>DNA damage, repair, modifications</td>
<td>Sita Reddy</td>
</tr>
<tr>
<td>Wed 09/08/21 06:00p - 07:50p</td>
<td>Transcription and its regulation (I)</td>
<td>Judd Rice</td>
</tr>
<tr>
<td>Mon 09/13/21 06:00p - 07:50p</td>
<td>Transcription and its regulation (II)</td>
<td>Judd Rice</td>
</tr>
<tr>
<td>Wed 09/15/21 06:00p - 07:50p</td>
<td>RNA processing, transport and degradation</td>
<td>Sita Reddy</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Topic</td>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td>Mon 09/20/21</td>
<td>06:00p - 07:50p</td>
<td>Translation</td>
</tr>
<tr>
<td>Wed 09/22/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
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<tr>
<td>Mon 09/27/21</td>
<td>06:00p - 07:50p</td>
<td>Carbohydrate Metabolism and Diabetes</td>
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<tr>
<td>Wed 09/29/21</td>
<td>06:00p - 07:50p</td>
<td>Bioenergetics and mitochondria</td>
</tr>
<tr>
<td>Mon 10/04/21</td>
<td>06:00p - 07:50p</td>
<td>Lipid metabolism: Fatty acids, phospholipids, gangliosides and Tay-Sachs disease</td>
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<tr>
<td>Wed 10/06/21</td>
<td>06:00p - 07:50p</td>
<td>Cholesterol, lipoproteins and atherosclerosis</td>
</tr>
<tr>
<td>Mon 10/11/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
</tr>
<tr>
<td>Wed 10/13/21</td>
<td>06:00p - 07:50p</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>Mon 10/18/21</td>
<td>06:00p - 07:50p</td>
<td>Protein Structure</td>
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<tr>
<td>Wed 10/20/21</td>
<td>06:00p - 07:50p</td>
<td>Experimental approaches to protein structure</td>
</tr>
<tr>
<td>Mon 10/25/21</td>
<td>06:00p - 07:50p</td>
<td>Enzymes</td>
</tr>
<tr>
<td>Wed 10/27/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
</tr>
<tr>
<td>Mon 11/01/21</td>
<td>06:00p - 07:50p</td>
<td>1) Introduction to Cell Signaling 2) Nuclear Hormone Receptor Family</td>
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<tr>
<td>Wed 11/03/21</td>
<td>06:00p - 07:50p</td>
<td>G protein-coupled receptors</td>
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<td>Mon 11/08/21</td>
<td>06:00p - 07:50p</td>
<td>PI3-kinase and PTEN</td>
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<tr>
<td>Wed 11/10/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
</tr>
<tr>
<td>Mon 11/15/21</td>
<td>06:00p - 07:50p</td>
<td>1) Receptor tyrosine kinases 2) Cytokine signaling</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Topic</td>
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</tr>
<tr>
<td>Wed 11/17/21</td>
<td>06:00p - 07:50p</td>
<td>BMP/TGFβ signaling</td>
</tr>
<tr>
<td>Mon 11/22/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
</tr>
<tr>
<td>Mon 11/29/21</td>
<td>06:00p - 07:50p</td>
<td>Wnt, Hedgehog, NFκB, Notch signaling</td>
</tr>
<tr>
<td>Wed 12/01/21</td>
<td>06:00p - 07:50p</td>
<td>Cancer</td>
</tr>
<tr>
<td>Mon 12/06/21</td>
<td>06:00p - 07:50p</td>
<td>CATCH UP and REVIEW SESSION</td>
</tr>
<tr>
<td>Wed 12/08/21</td>
<td>06:00p - 07:50p</td>
<td>Final Exam</td>
</tr>
</tbody>
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**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