

CHEM 8823

Analytical Biochemistry

Fall 2017

Chem 8823 course is an introduction to analytical techniques (tools and approaches) used at the interface of chemistry and biology. The general goal of this class is to appreciate how combination of techniques in Chemistry and Biology can be applied to answer biological questions with a focus on roles of small molecules from the human and environmental microbiome.

Time and Venue

Monday, Wednesday, and Friday
0905-0955 am
MoSE G021

Instructor

Dr. Neha Garg
Assistant Professor
School of Chemistry and Biochemistry
Office: EBB 4016
Office hours: by appointment
Email: neha.garg@chemistry.gatech.edu

Prerequisites

Familiarity with the fundamental aspects of nucleic acids, proteins, and biological small molecules.

Text Book

No text book required. Materials will be shared as required.

Access to Course Material

The teaching material will be available to you on the shared Google Drive folder:

Missed Exams

Exams will be either take home or interactive powerpoint presentation style and may involve group effort. All three exams will be announced on first day of class. There are no scheduled makeup exams. Students must attend every exam. Absences for Institute Approved Activities must be discussed with the instructor



no later than three weeks prior to the date of the exam. In addition to the verbal request, the request must be registered in an email message to the instructor. See www.deanofstudents.gatech.edu for information on Institute Approved Activities.

Ethics Policy

Please refer to the Georgia Institute of Technology's academic honor code here: www.honor.gatech.edu, and here: <http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code> which you are required to uphold. Academic dishonesty, and discriminatory and/or intimidatory behavior will not be tolerated.

Course Schedule

This is a tentative course schedule. We will make all attempts to adhere to this schedule. Any changes will be announced in class, via email, and will reflect on the shared Google Calendar as appropriate.

| Date | Topic |
|---------------|---|
| August 21 (M) | Introduction to course |
| August 23 (W) | Introduction to biological small molecules, nucleic acids, and proteins |
| August 25 (F) | Analyses of DNA, RNA, and protein 1 |
| August 28 (M) | Analyses of DNA, RNA, and protein 2 |
| August 30 (W) | Recombinant protein expression |
| Sep 1 (F) | Recombinant protein expression |
| Sep 4 (M) | Labor Day |
| Sep 6 (W) | Model systems |
| Sep 8 (F) | Characterization of biomolecular interactions 1 |
| Sep 11 (M) | Characterization of biomolecular interactions 2 |
| Sep 13 (W) | Applications of unnatural amino acid |
| Sep 15 (F) | Phage Display and yeast-two hybrid systems |
| Sep 18 (M) | Applications of Fluorescence in Chemical Biology 1 |
| Sep 20 (W) | Applications of Fluorescence in Chemical Biology 2 |
| Sep 22 (F) | Activity based profiling |
| Sep 25 (M) | Activity based profiling |
| Sep 27 (W) | Flow cytometry |
| Sep 29 (F) | Discussion Day |
| Oct 2 (M) | Exam 1 |
| Oct 4 (W) | Biosynthesis of small molecules -1 |
| Oct 6 (F) | Biosynthesis of small molecules -2 |
| Oct 9 (M) | Fall Break |
| Oct 11 (W) | Single molecule analyses |
| Oct 13 (F) | Analyses of the human microbiome |
| Oct 16 (M) | Analyses of the human microbiome |
| Oct 18 (W) | Chromatography of small molecules |
| Oct 20 (F) | Introduction to "Omics" |
| Oct 23 (M) | Basics of Mass Spectrometry (Small molecule metabolomics) |
| Oct 25 (W) | Acquisition of mass spectrometry data |
| Oct 27 (F) | Analyses/Dereplication of mass spectrometry data-1 |
| Oct 30 (M) | Analyses/Dereplication of mass spectrometry data-2 |
| Nov 1 (W) | MALDI MS |
| Nov 3 (F) | Applications of MALDI MS |
| Nov 6 (M) | Discussion Day |
| Nov 8 (W) | EXAM 2 Day 1 |
| Nov 10 (F) | EXAM 2 Day 2 |
| Nov 13 (M) | In-class Practical data analyses day-1 |
| Nov 15 (W) | In-class Practical data analyses day-2 |
| Nov 17 (F) | Imaging mass spectrometry-1 |
| Nov 20 (M) | Imaging mass spectrometry-2 |
| Nov 22 (W) | Thanksgiving break |
| Nov 24 (F) | Thanksgiving break |

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| Nov 27 (M) | Hands on mass spectrometry data collection |
| Nov 29 (W) | Data Analyses Day 1 |
| Dec 1 (F) | Data Analyses Day 2 |
| Dec 4 (M) | Discussion Day |
| Dec 13 (W) | EXAM 3 |