

IMPORTANT: This syllabus form should be submitted to OAA (gsbs_academic_affairs@uth.tmc.edu) a week before the start of each semester.

NOTE to STUDENTS: If you need any accommodations related to attending/enrolling in this course, please contact one of the Graduate School's 504 Coordinator, Natalie Sirisaengtaksin, PhD. We ask that you notify GSBS in advance (preferably at least 3 days before the start of the semester) so we can make appropriate arrangements.

Term and Year: Summer 2026 Course Number and Course Title: GS03 1211: Current Methods in Cell and Translational Biology (CMMTB) Module 1: Core Methods in Molecular and Translational Biology Credit Hours: 1 Prerequisites: The GSBS Core Course is a prerequisite for PhD students. It is recommended that the undergraduate background of all students include 1 or 2 semesters of biochemistry Meeting Location: UTHealth Houston McGovern Medical School Building/Room: MSB 2.135	Program Required Course: Yes Approval Code: No Audit Permitted: Yes Classes Begin: July 4, 2026 Classes End: August 7, 2026 Final Exam Week: August 10, 2026				
Class Meeting Schedule <table border="1"> <thead> <tr> <th>Day</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>Monday, Wednesday, Friday</td> <td>9:00 to 10:00 a.m.</td> </tr> </tbody> </table>		Day	Time	Monday, Wednesday, Friday	9:00 to 10:00 a.m.
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Course Director Name and Degree: John A. Putkey, PhD Title: Professor Department: Biochemistry and Molecular Biology Institution: UTHealth Houston Email Address: John.Putkey@uth.tmc.edu Contact Number: 715-500-6061 NOTE: Office hours are available by request. Please email me to arrange a time to meet.	Instructors 1. John Putkey, PhD Institution: UTHealth Houston Email Address: John.Putkey@uth.tmc.edu 2. Joseph Alcorn, PhD Institution: UTHealth Houston Email Address: Joseph.Alcorn@uth.tmc.edu 3. Shane Cunha, PhD Institution: UTHealth Houston Email Address: Shane.R.Cunha@uth.tmc.edu				

	4. Carmen Dessauer, PhD Institution: UTHealth Houston Email Address: Carmen.Dessauer@uth.tmc.edu 5. Mary Cindy Farach-Carson, PhD Institution: UTHealth Houston Email Address: Mary.C.Farachcarson@uth.tmc.edu 6. Travis Moore, PhD Institution: UTHealth Houston Email Address: Travis.I.Moore@uth.tmc.edu 7. Zhichao Xu, PhD Institution: UTHealth Houston Email Address: zhichao.xu.1@uth.tmc.edu
Course Description: The Core Module of Current Methods in Molecular and Translational Biology is designed to complement three other modules that focus on more advanced techniques in: 1) Advanced Omics; 2) Structural and Functional Analysis of Proteins; and 3) Animal and Cell Model Systems. Each of the four Modules is a 1-unit course. The Core Module consists of 14 lectures. Individual lecturers in the Core Module are chosen based on their first-hand expertise in the relevant technologies. The spectrum of technologies includes antibodies, fundamentals of DNA and RNA analysis, microscopy and cell culture, expression of proteins in foreign hosts, and protein isolation. The goal of the lectures is to provide students with a sound foundation in the principles of the techniques as well as their common applications. The lecturers will also pass on their personal experiences regarding pros and cons of the technologies and lab-bench “tips”.	
Textbook/Supplemental Reading Materials • No required textbook	
<u>Course Objective/s:</u> Upon successful completion of this course, students will • Provide students with the scientific basis of common techniques used in biomedical research • Explain the pros and cons of specific techniques • Provide students with typical applications of these techniques	

- Ensure that students understand the limitations of specific techniques with respect to application and data interpretation.

Specific Learning Objectives:

1. Understand the principles and applications of electrophoresis of proteins and nucleic acids.
2. Know the principles and application of antibody-based techniques including antibody specificity, and validation.
3. Understand the principles of basic techniques to extract, quantify, and manipulate nucleic acids for molecular biology applications, including PCR, cloning, and hybridization.
4. Be able to compare bacterial and eukaryotic protein expression systems by evaluating their advantages, limitations, and suitability for producing recombinant proteins.
5. Be familiar with common approaches to protein isolation including preparation of a soluble fraction and the major types of liquid chromatography.
6. Be aware of spectroscopy and ligand-binding assays to assess protein-protein interactions and molecular binding kinetics.

Student responsibilities and expectations:

Students enrolled in this course will be expected to perform the following activities

1. Review recommended reading material
2. If required material is assigned, it should be read before the associated lecture
3. Attend 3 1-hour lectures per week
4. Prepare for two exams
5. View recorded lectures if the in-person lecture is missed

The use of generative AI tools (e.g., ChatGPT) in this course is subject to the discretion of the course director and lecturers. Whenever relevant, specific guidelines will be provided on whether using AI-generated content is permitted. Cheating or engaging in unethical behavior during examinations (quizzes and final), as well as on homework assignments or other coursework when applicable, will be grounds for dismissal from the course without credit and further GSBS disciplinary action.

Grading System: Letter Grade (A-F)

Student Assessment and Grading Criteria:

Percentage	Description
Exams (90 %)	Two (2) in-class exams will represent 90% of the total grade. The specific percent of the total grade assigned to each exam will be at the discretion of the course director.

	In-class exam 1 will cover all material presented prior to the exam. Exam 2 will cover material presented after Exam 1. All individual lectures will be assigned equal points on the exams. Homework may be assigned by a lecturer for a specific lecture in lieu of questions on the exam. Points awarded for the homework assignment will be added to the total points received for the in-class exam.
Participation and/or Attendance (10 %)	Attendance will be noted. Students must provide excuses for absences.

CLASS SCHEDULE

Day	Date	Hour	Topic	Lecturer
Fri	7/04		Independence Day	
Mon	7/06	1	Course Introduction and Electrophoresis	Putkey
Wed	7/08	1	Spectroscopy: UV/Vis/FRET	Putkey
Fri	7/10	1	Microscopy: Principles	Moore
Mon	7/13	1		
Wed	7/15	1	Fundamentals of DNA and RNA techniques 1	Cunha
Fri	7/17	1	Fundamentals of DNA and RNA techniques 2	Putkey
Mon	7/20	1	Fundamentals of DNA and RNA techniques 3	Xu
Wed	7/22	1	Exam 1	
Fri	7/24	1	Protein Expression: Bacteria	Putkey
Mon	7/27	1	Introduction to Cell Culture	Farach-Carson
Wed	7/29	1	Protein Expression: Eucaryotic Cells	Dessauer
Fri	8/31	1	Protein Isolation 1	Putkey
Mon	8/03	1	Protein Isolation 2	Alcorn
Wed	8/05	1	Antibodies: Generation, Specificity and Validation	Alcorn
Fri	8/07	1	Ligand binding and Protein-Protein Interactions	Putkey
Mon	8/10	1	Exam 2	