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: **Fall 2026** Course Number and Course Title: **GS03 1221: Current Methods in Molecular and Translational Biology (CMMTB) Module 2: Advanced OMICS** **Credit Hours: 1** **Prerequisites:** The GSBS Core Course is a prerequisite for PhD students. While there is no other specific prerequisite for this course, registered students are expected to have a basic understanding of cell and molecular biology from undergraduate courses. **Meeting Location:** UTHealth Houston McGovern Medical School **Building/Room #:** MSB 3.301	**Program Required Course:** Yes **Approval Code:** No **Audit Permitted:** Yes **Classes Begin:** August 31, 2026 **Classes End:** Oct. 2, 2026

Class Meeting Schedule

Day	Time
August 31 – October 2, 2026 (Monday, Wednesday, Friday)	**3-4:30pm**

Course Director Name and Degree: **Dung-Fang Lee, PhD** Title: **Associate Professor** Department: **Biochemistry and Molecular Biology** Institution: **UTHealth Houston** Email Address: **Dung-Fang.Lee@uth.tmc.edu** Contact Number: **715-500-6132** **Course Co-Director/s:** (if any) Name and Degree: **Xiaotian Zhang, PhD**	**Instructors** 1. **Dung-Fang Lee, PhD** Institution: UTHealth Houston Email Address: Dung-Fang.Lee@uth.tmc.edu 2. **Xiaotian Zhang, PhD** Institution: UTHealth Houston Email Address: Xiaotian.Zhang@uth.tmc.edu 3. **Catherine Denicourt, PhD** Institution: UTHealth Houston

Title: **Assistant Professor**

Department: Biochemistry and Molecular Biology

Institution: **UTHealth Houston**

Email Address: **Xiaotian.Zhang@uth.tmc.edu**

Contact Number: 713-500-5146

NOTE: Office hours are available by request. Please email me to arrange a time to meet.

Email Address:Catherine.Denicourt@uth.tmc.edu

4. **Priyatansh Gurha, PhD**

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9. **Ruiying Zhao, MD, PhD**

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10. **Yong Zhou, PhD**

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Email Address: YYong.Zhou@uth.tmc.edu

Course Description:

This module is a component of the course “Current Methods in Molecular and Translational Biology” that is designed to introduce students to the various OMICS research methods applicable to their research studies. It provides an overview of cutting-edge knowledge and techniques in OMICS, covering concepts, analytical skills, and experimental approaches. Over 12 lectures, students will learn essential techniques and approaches for systematically investigating proteins, lipids, metabolites, RNA, modified RNA, DNA, histones, and chromatin architecture using unbiased research methods and thinking to understand biological processes on a genome-wide scale. The lecturers, having applied these techniques in their own research, will share personal insights and experiences, highlighting the practical applications and real-world implementation of these technologies to facilitate students' research.

Textbook/Supplemental Reading Materials

- No general textbook is required, but lecturers will provide teaching materials (slides) and recommend reference readings for specific lectures.

Course Objective/s:

Upon successful completion of this course, students will learn the following specific objectives:

***Specific Learning Objectives*:**

1. Introduce students to the fundamental concepts and techniques of OMICS approaches for their research.
2. Help students gain insights into the practical applications of OMICS techniques in addressing fundamental biological problems through examples.
3. Enable students to be familiar with established programs for OMICS data analysis.
4. Provide hands-on examples for students to practice OMICS analysis.

Student responsibilities and expectations:

Students enrolled in this course are expected to complete the following activities:

1. Students should complete all assigned reading materials before class whenever possible
2. Review all lecture materials, including recommended review articles and research papers
3. Prepare for the final examination using reading materials provided by lecturers
4. Attend all 1-hour lectures
5. Watch recorded lectures if students cannot attend 1-hour lectures.

Students are expected to complete all assigned reading material prior to class. While you may work and discuss all course materials and assignments in groups, all writing assignments must be your own unless otherwise instructed. Whenever relevant, specific guidelines will be provided on whether using AI-generated content is permitted. Plagiarism and failure to properly cite scientific literature and other sources will not be tolerated and are grounds for dismissal from the course and further GSBS disciplinary action. Cheating or engaging in unethical behavior during examinations 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: *(May include the following:)*

Percentage	Description
Homework	At their discretion, Instructors may assign appropriate homework for grading. If homework is assigned for a specific lecture, the homework assignment will be in lieu of questions on that lecture subject matter on the exam.

Homework (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 %)	The material covered in these lectures is likely new to many students. Therefore, attendance and participation in classroom discussions is considered critical. Attendance will be assessed toward 10% of final grade to encourage participation.

CLASS SCHEDULE

Date	Duration (Hour(s) taught by lecturer)	Lecture Topic	Lecturer/s
08/31	**1**	Proteomics	Yang Liu
9/2	**1**	Lipidomics	Yong Zhou
9/4	**1**	Metabolomics	Junchen Liu
9/9	**1**	Transcriptomics	Ruiying Zhao
9/11	**1**	Epitranscriptomics	Dung-Fang Lee
9/14	**1**	Translatomics	Catherine Denicourt
9/16	**1**	OMICS Exam 1	
9/18	**1**	Chromatinomics and Epigenomics	Priyatansh Gurha
9/21	**1**	Methylomics	Xiaotian Zhang
9/23	**1**	3D Genomics	Zhichao Xu
9/25	**1**	Single-cell Transcriptomics	Noriaki Ono
9/28	**1**	Single-cell Transcriptomics	Noriaki Ono
9/30	**1**	Functional Genomics	Xiaotian Zhang
10/2	**1**	OMICS Exam2	

DFL/jal