HUN 4813C
Laboratory Techniques in Molecular Nutrition
Fall 2025 – Section 21GF (13113)

Instructor: Zhiyong Cheng, PhD
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Office hours Mondays (2:00-3:00 pm) by appointment; FSHN - Room 265

Class location and meeting times: M: Periods 3-5 (9:35 am – 12:35 pm), FSN 0310
W: Periods 3-4 (9:35 am –11:30 am), TUR 2353

Attendance: Required
Credits: 3

Course Description and Prerequisites: The course discusses theories, applications, and best practices of laboratory techniques in molecular nutrition research. It will cover both gold standards and cutting-edge research techniques. Prerequisites: CHM 2211, CHM 2211L, BCH 3025 or BCH 4024

Course Learning Objectives: By the end of this course, students will be able to

1. Explain the principles of laboratory techniques for molecular nutrition research.
2. Choose research methods effectively to accomplish research goals.
3. Design and plan feasible projects to address real-life questions.
4. Interpret and conclude about experimental data with inference.
5. Examine and critique published research.

Recommended Text: No required textbook for this course. Class materials will be posted at Canvas. Instructional materials for this course consist of only those materials specifically reviewed, selected, and assigned by the instructor. The instructor is only responsible for these instructional materials.

Class/Laboratory Attendance and Make-Up Work: Class attendance and participation are required. Make-up exams, assignments, and other work in the course are consistent with university policies: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Student Evaluation: The assessments comprise of 6 quizzes (25 points each), 9 lab protocols & reports (12 points each), 8 research reflections (8 points each), a project presentation (50 points), and class participation (28 points). Quizzes will be timed and closed book. Each quiz will consist of 8 'choose an answer among multiple choices' questions and 2 short answer questions. The assessments, including instructions and grading rubrics, will be posted on Canvas.

Grade Breakdown	**Points**
Quizzes (25 pts x 6)	150
Lab protocols & report (12 pts x 9)	108
Reflections (8 pts x 8)	64
Project presentation	50
Class participation	28

Total	400

Grading scale (Grades are not curved or negotiable; final grade in % other than arbitrary points)

A = 370-400 **92.5-100%**	A– = 358-369 **89.5-92.25%**	B+ = 346-357 **86.5-89.25%**	B = 330-345 **82.5-86.25%**	B– = 318-329 **79.5-82.25%**	C+ = 306-317 **76.5-79.25**
C = 290-305 **72.5-76.25%**	C– = 278-289 **69.5-72.25%**	D+ = 266-277 **66.5-69.25%**	D = 250-265 **62.5-66.25%**	D– = 238-249 **59.5-62.25%**	E = <238 **<59.5%**

Current UF Grading Policies: Please see the following link for information on grade point equivalencies: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Attendance and Participation Rubric

Criteria	Unsatisfactory-Beginning	Satisfactory-Developing	Excellent-Accomplished	Total
Attendance	**3 points**	**5 points**	**7 points**	**/7**
	6+ absences (unexcused)	3-5 absences (unexcused)	Besides the 2 penalty-free absences, attended all class sessions or received approval for necessary absences	
Frequency	**3 points**	**5 points**	**7 points**	**/7**
	Student does not initiate contribution & does not participate without prompting from the instructor.	Student sometimes initiates contribution, but does so infrequently (fewer than half of the class sessions)	Student initiates contribution in at least half of the class sessions	
Quality	**3 points**	**5 points**	**7 points**	**/7**
	Comments are uninformative and lacking in appropriate terminology. Heavy reliance on opinion and personal taste.	Comments are sometimes constructive, but not always relevant to the discussion. Student sometimes uses appropriate terminology.	Comments are mostly insightful & constructive; student mostly uses appropriate terminology.	
	3 points	**5 points**	**7 points**	**/7**

Listening	Does not listen to others; regularly talks while others speak or does not pay attention while others speak; detracts from discussion; sleeps, etc.	Student is mostly attentive when others present materials and perspectives, but sometimes needs to be reminded of the class focus.	Student listens attentively when others present materials and perspectives, as indicated by comments that build on others' remarks, i.e., student hears what others say & contributes to the dialogue.	
				/28

Adapted from Carnegie Mellon

Punctuality: Punctuality is expected for class, tests, meetings and all other assigned responsibilities. This reflects respect for the other students and the instructor and responsible behavior on your part. Additional time will not be given if you are late for an assignment/test. If a quiz is missed because of lateness to class, you will not be allowed to make it up. Attendance will be taken at the start of classes or as otherwise designated on the syllabus for courses in which instructors incorporate attendance points in grading. Attendance credit will not be given if you are late for class or are otherwise noncompliant with course attendance policy.

Course Evaluation: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways: (1) the email they receive from GatorEvals, (2) their Canvas course menu under GatorEvals, and (3) the central portal at https://my-ufl.bluera.com. Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

The University's Honesty Policy: UF students are bound by The Honor Pledge which states "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the UF Conduct Code website for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

In-Class Recording: Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal education use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and deliver by an instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless, of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes

a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Academic Policies & Resources
Visit the kink: https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/

Campus Health and Wellness Resources
UF Whole Gator Resources: Visit https://one.uf.edu/whole-gator/discover for resources that are designed to help you thrive physically, mentally, and emotionally at UF.

Cell Phones: Audio ringers on cell phones must be deactivated before entering the classroom. Cell phone use is not permitted during class time unless an instructor permits it as part of class activities.

Email: Students are required to check their email account(s) daily (at least Monday through Friday) and respond to course/program related requests, inquiries, etc. in a timely manner.

Use of artificial intelligence (AI) tools: If students use AI tools to prepare their assignments, it is the students' responsibility to ensure the information credibility, acknowledge the AI assistance and sources, and abide by the UF Honor Code. AI tools are not allowed for closed-book quizzes or exams.

Software Use: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Topics and Schedule: (subject to change)

Classes/Dates	Topics	Notes
1 (8/25, M)	• Class overview • Identifying your #1 research questions	• Reflection 1
2 (8/27, W)	• Research compliance ✓ IRB (Institutional Review Board) ✓ IACUC (Institutional Animal Care and Use Committee) ✓ IBC (Institutional Biosafety Committee) ➢ Working with a fume hood/biosafety cabinet ➢ Preserving biological samples at low temperature	• Reflection 2
3 (9/1, M)	• Holiday	
4 (9/3, W)	• Key factors to consider for project design ✓ Study design ✓ Sample size ✓ Sampling bias ✓ Variable control • How to build a strong project (instructions and tips)	

5 (9/8, M)	• General lab techniques ✓ Sample transfer and handling ➢ Pipetting with micropiptettor ➢ Pipetting with serological pipettors ✓ Sample preparation with centrifuges	• Protocol 1 • Questions get answered
6 (9/10, W)	• Overview of commonly measured parameters ✓ Nutrients and metabolites ✓ Gene expression and variants ✓ Proteins (enzymes, transporters, signal molecules) ✓ Hormones and signaling pathways	• Reflection 3
7 (9/15, M)	• Work on Research Proposal outline (no class)	• Outline due to TA via email at 11:59 pm
8 (9/17, W)	• Protein analysis – principles (I) ✓ Spectrophotometry (total protein analysis) ✓ Mass spectrometry (m/z) • Proteomics	• Quiz 1
9 (9/22, M)	• Fasting/feeding physiology ✓ Spotlight on Glucose (or cholesterol)	• Protocol 2 • FSN 227
10 (9/24, W)	• Protein analysis – principles (II) ✓ WB ✓ IHC	• Reflection 4
11 (9/29, M)	• Protein analysis – lab section (I) ✓ Spectrophotometry (total protein)	• Protocol 3 • Questions get answered
12 (10/1, W)	• Protein analysis – principles (III) ✓ IP ✓ ChIP and ChIPseq	• Quiz 2
13 (10/6, M)	• Work on Research Proposal layout (no class)	• Layout due to TA via email at 11:59 pm
14 (10/8, W)	• Protein analysis – principles (IV) ✓ ELISA and Protein array	• Reflection 5
15 (10/13, M)	• Protein analysis - lab section (II) ✓ SDS-PAGE, Protein transfer	• Protocol 4 • Questions get answered
16 (10/15, W)	• Gene analysis - principles (I) ✓ Spectrophotometry (total DNA, RNA)	• Reflection 6 • Quiz 3
17 (10/20, M)	• Protein analysis - lab section (III) ✓ Immunoblotting and imaging	• Protocol 5 • Project checkup

18 (10/22, W)	• Gene analysis - principles (II) ✓ PCR (specific gene expression) ✓ DNA/RNA Microarray	• Reflection 7
19 (10/27, M)	• Gene analysis - lab section (I) ✓ DNA/RNA QC	• Protocol 6
20 (10/29, W)	• Gene analysis - principles (III) ✓ Sequencing techniques ➢ Sanger Sequencing ➢ NGS	
21 (11/3, M)	• Gene analysis - lab section (II) ✓ Fasting/feeding genes via PCR	• Protocol 7 • Questions get answered
22 (11/5, W)	• Hormone analysis - principles ✓ Peptide hormone analysis ➢ ELISA, IHC/ICC, WB ✓ Small molecule hormones ➢ Hormone level ➢ LC/MS or GC/MS ✓ Pathway analysis (PCR, WB, IHC/ICC)	• Quiz 4
23 (11/10, M)	• Hormone analysis – lab section ✓ Lean/obese adiponectin by ELISA	• Protocol 8 • Questions get answered
24 (11/12, W)	• Nutrient and metabolite analysis - principles ✓ PCR ✓ WB, ELISA ✓ Spectrophotometry/spectrometry ✓ Metabolomics (MS, NMR, etc.)	• Quiz 5
25 (11/17, M)	• Nutrient and metabolite analysis – lab section ✓ Ketone body	• FSN 227 • Protocol 9 • Pick the dates of presentation
26 (11/19, W)	• Research Proposal – Oral presentation (I)	
27 (11/24, M)	• Holiday	
28 (11/26, W)	• Holiday	
29 (12/1, M)	• Research Proposal – Oral presentation (II)	• Questions get answered
30 (12/3, W)	• Omics approaches and personalized nutrition ✓ Personalized nutrition ✓ Omics in personalized nutrition • Ongoing clinical trials of personalized nutrition	• Quiz 6 • Reflection 8
31 (12/8, M)	• Exam week (no class)	• Reflection 8 due