

HUN 4813C
Laboratory Techniques in Molecular Nutrition
Summer A 2020 – Section 1212 (17661)

Instructor: Zhiyong Cheng, PhD
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Office hours: Tuesdays 10:00 am – 12:00 pm (via Zoom)
*If you cannot make my regularly scheduled office hours (or those of the TAs), you may e-mail me to schedule an appointment.

**Teaching assistants:
(and office hours)** Limin "Vincent" Shi (shi.limin@ufl.edu);
Thursday, 2:00-4:00 PM (via Zoom), Room 265 FSHN

**Class location and
meeting times:** Online
Periods 2-3 (9:30 am – 12:15 pm)

Attendance: Required
Credits: 3

Course Description and Prerequisites: The course focuses on laboratory techniques relevant to the study of molecular nutrition, ranging from biochemistry, molecular biology, genomics and bioinformatics. The Lecture session discusses the principles and application examples of different techniques used in molecular nutrition research. Due to COVID-19, this course will be administered online, where real-life scenarios will be employed to demonstrate how to design a study and address research questions regarding molecular nutrition, and how to examine and interpret published research.

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. Describe and explain the principles of laboratory techniques for molecular nutrition research.
2. Design and plan feasible experiment to address research questions.
3. Interpret experimental data from commonly used techniques.
4. Examine published research and methods.
5. Apply knowledge and critical thinking skills to real-life questions.

This course uses the e-Learning (Canvas) system for postings of various class materials, as well as scores for quizzes and assignments. Access to e-Learning requires a Gatorlink account. To establish a Gatorlink account, go to <http://www.gatorlink.ufl.edu/>. Once you have created an account, access the e-learning homepage at <http://elearning.ufl.edu/>. Continue with e-Learning Login using your Gatorlink ID.

Recommended Text: (Optional) There is no required textbook for this course. Power Point slides and reading assignments from various sources (e.g. textbook chapters, current articles, etc.) will be posted at Canvas.

Class/Laboratory Attendance and Make-Up Work: In accordance with the University of Florida's policy: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>, class attendance and participation are mandatory. Students will behave in an appropriate manner in class, taking care not to disrupt other students learning activities. Students are asked to be punctual and submit assignments on time. Make-up work and assignments are consistent with university policies (visit the link shown above).

Student Evaluation:

The assessments will be comprised of 10 quizzes (12 points each), 10 research reflections (15 points each), 1 paper of project design (80 points), and 1 oral presentation of project design (50 points). Quizzes and assignments will be administered in class. Assignment instructions and grading rubrics will be posted at Canvas.

Grade Breakdown oral presentation	Points
Quizzes (12 points x 10)	120
Research & Reflections (15 points x 10)	150
Project design - report	80
Project design - oral presentation	50
Total	400

Grading scale (Grades are not curved or negotiable):

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:
<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Contact information: 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

Service	Location	Phone	Web site	Services provided
University Counseling and Wellness Center	3190 Radio Road	352-392-1575	www.counseling.ufl.edu/cwc/	<ul style="list-style-type: none"> • Counseling Services - individual and group • Groups and Workshops • Outreach and Consultation • Self-Help Library • Wellness Coaching • Training Programs • Community Provider Database
U Matter We Care		352-294-CARE	www.umatter.ufl.edu	Care-related programs and resources for students and employees
Career Connections Center	Wayne Reitz Union (1st Floor)	352-392-1601	https://career.ufl.edu/	Career development assistance and counseling

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. Nighttime and weekend crisis counselors are available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.
- Online Course: <https://distance.ufl.edu/student-complaint-process/>

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.

Other Information: Lecture materials and other information are the property of the University of Florida and the course instructor and may not be used for any commercial purpose. Students found in violation may be subject to disciplinary action under the University's Student Conduct Code. Only students formally registered for the course are permitted to attend lectures and take exams.

We the members of the University of Florida community pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

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.

Topics and Schedule: (subject to change)

Classes/Dates	Topics	Notes
1 (5/13, W)	<ul style="list-style-type: none"> • Class overview • Identifying your # 1 research questions • <u>Approvals</u> needed to carry out your studies <ul style="list-style-type: none"> • IRB (Institutional Review Board) • IACUC (Institutional Animal Care and Use Committee) • IBC (Institutional Biosafety Committee) 	<ul style="list-style-type: none"> • Reflection 1
2 (5/14, R)	<ul style="list-style-type: none"> • Key factors to consider for a project design • Overview of lab techniques <ul style="list-style-type: none"> • Nutrients and metabolites • Genes expression and variants • Proteins (enzymes, transporters, signal molecules) • Hormones 	<ul style="list-style-type: none"> • Quiz 1 • Reflection 2
3 (5/20, W)	<ul style="list-style-type: none"> • From nutrients to life: the roles of genes and proteins • Protein-centered lab techniques <ul style="list-style-type: none"> • Spectrophotometry (total protein analysis) • Mass spectrometry (m/z) <ul style="list-style-type: none"> • Proteomics 	<ul style="list-style-type: none"> • Quiz 2 • Reflection 3
4 (5/21, R)	<ul style="list-style-type: none"> • Protein-centered lab techniques <ul style="list-style-type: none"> • Introduction to immuno-assays • WB • IHC/ICC/IF 	<ul style="list-style-type: none"> • Quiz 3 • Reflection 4
5 (5/27, W)	<ul style="list-style-type: none"> • Protein-centered lab techniques <ul style="list-style-type: none"> • IP • Protein array • ChIP and ChIPseq 	<ul style="list-style-type: none"> • Quiz 4 • Reflection 5
6 (5/28, R)	<ul style="list-style-type: none"> • Gene-centered lab techniques <ul style="list-style-type: none"> • Spectrophotometry (total DNA, RNA) • PCR (specific gene expression) <ul style="list-style-type: none"> • RT-PCR, qPCR 	<ul style="list-style-type: none"> • Quiz 5 • Reflection 6

7 (6/3, W)	<ul style="list-style-type: none"> • Gene-centered lab techniques <ul style="list-style-type: none"> • Microarray (high-throughput gene analysis) • Deep sequencing (hi-throughput gene analysis) <ul style="list-style-type: none"> • DNA sequencing • RNA sequencing 	<ul style="list-style-type: none"> • Quiz 6 • Reflection 7
8 (6/4, R)	<ul style="list-style-type: none"> • Hormone-centered lab techniques <ul style="list-style-type: none"> • Nutrients and hormonal signaling • Measuring methods <ul style="list-style-type: none"> • Hormone level <ul style="list-style-type: none"> • PCR analysis of gene • ELISA/EIA • LC/MS or GC/MS • Hormonal signaling pathways (WB, IHC, ICC, IF) 	<ul style="list-style-type: none"> • Quiz 7 • Reflection 8
9 (6/10, W)	<ul style="list-style-type: none"> • Nutrient and metabolite-centered lab techniques <ul style="list-style-type: none"> • PCR • WB, ELISA • Research examination 	<ul style="list-style-type: none"> • Quiz 8 • Reflection 9
10 (6/11, R)	<ul style="list-style-type: none"> • Nutrient and metabolite-centered lab techniques <ul style="list-style-type: none"> • Spectrophotometry/spectrometry • Metabolomics (MS, NMR, etc.) • Research examination 	<ul style="list-style-type: none"> • Quiz 9 • Reflection 10
11 (6/17, W)	<ul style="list-style-type: none"> • Omics approaches and personalized nutrition <ul style="list-style-type: none"> • Personalized nutrition • Omics in personalized nutrition • Ongoing clinical trials of personalized nutrition 	<ul style="list-style-type: none"> • Quiz 10
12 (6/18, R)	<ul style="list-style-type: none"> • Omics approaches and personalized nutrition <ul style="list-style-type: none"> • Research examination • Oral presentation of Study Design 	<ul style="list-style-type: none"> • Study Design Report due at 11:00 pm