

**HUN4936/HUN6936**  
**Nutritional Epigenomics and Metabolic Disease**  
**Fall 2024 –Section EPGN (29999)/Section EPGE (21992)**



**Instructor:** Zhiyong Cheng, PhD  
**Department:** Food Science and Human Nutrition  
**Office:** Room 265B, FSHN Bldg.  
**Phone:** 352-294-3728  
**Email:** z.cheng@ufl.edu

**Office hours:** Wednesdays 3:00 – 4:00 pm or by appointment

**Class location and meeting times:** Tuesdays, Period 8 (3:00 PM - 3:50 PM); CSE E220  
Thursdays, Period 7 - 8 (1:55 PM - 3:50 PM), RNK 0106

**Attendance:** Required  
**Credits:** 3

**Course Description and Prerequisites:** This course discusses nutrient-gene interactions, and how the interactions regulate expression of genes and proteins and cell metabolism. Specifically, the course covers the basis of epigenetics (i.e., DNA methylation, histone modification, and non-coding RNA), nutritional contributions to epigenetic programming, and epigenetic mechanisms underlying metabolic disease (e.g., obesity, diabetes, cardiovascular disease, and cancer).

Prerequisites for Undergraduates: BSC2010 or an equivalent 2000/3000 level biology course that addresses gene or protein expression in the cell; Pre-requisites for Graduate Students: M.S. or Ph.D. students in life/health sciences.

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

1. Explain the molecular mechanisms of epigenetic programming.
2. Interpret the epigenetic roles of diets or nutrients.
3. Identify gaps and address controversies in current literature.
4. Apply epigenetics knowledge and research evidence to real-life questions.
5. Design studies or projects to address research questions.
6. Justify scientific positions or research ideas.

**Class Format:** In person. This class fosters an atmosphere of interactive learning where students exercise critical thinking, applying knowledge and facts to solving complex problems.

**Textbook:** None required. This course uses the e-Learning (Canvas) system for postings class materials (e.g., slides, chapters, or current research/review articles). 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.

**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.

**Student Evaluation:**

The assessments will be comprised of 5 quizzes (24 points each), 3 assignments (40 points each), and a final project: position paper or research proposal (writing – 60 points, and oral presentation -60 points). Quizzes and assignments will be administered in class. Quizzes will be 45-min timed and administered on Canvas. Each quiz (closed book) contains 8 'choose an answer among multiple choices' questions and 2 short-answer questions. Assignment instructions and

grading rubrics will be posted at Canvas. Class participation is highly valued and will be graded according to class attendance and contribution to class activities and discussions (see the grading rubrics on the next page).

Quizzes must be taken when scheduled. The lowest quiz grade will be dropped and four quiz grades will be counted towards the final grade (%). A missed quiz will count as the dropped quiz. Any other missed quizzes will result in a grade of "0" unless there are extenuating circumstances (subject to our discretion) that can be documented to our satisfaction. Extenuating circumstances include unavoidable, unplanned situations such as illness (chart note from physician or clinic; vague notes such as "was seen" are not acceptable); family death (dated obituary); accident (police report); or an interview at a professional school (official invitation), etc. An excused, documented absence from a quiz will result in the grade for the missed quiz being calculated as the average of the other quizzes.

Grade Breakdown	HUN4936 (Points)	HUN6936 (Points)
Quizzes (24 pts x 5)	120	120
Assignments: Research paper discussion (40 pts x 3)	N/A	120
Assignments: Research summary/snapshot (40 pts x 3)	120	N/A
Final paper - Position paper (60 pts)	60	N/A
Final paper - Research proposal (60 pts)	N/A	60
Final presentation - position paper or research proposal (60 pts)	60	60
Class participation (40 pts)	40	40
<b>Total</b>	<b>400</b>	<b>400</b>

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:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

### Attendance and Participation Rubric

Criteria	Unsatisfactory- Beginning	Satisfactory- Developing	Excellent- Accomplished	Total
<b>Attendance</b>	<b>4 points</b>	<b>6 points</b>	<b>10 points</b>	<b>/10</b>
	6+ absences	3-5 absences	Attended all class sessions or received approval for necessary absences	
<b>Frequency</b>	<b>4 points</b>	<b>6 points</b>	<b>10 points</b>	<b>/10</b>
	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	
	<b>4 points</b>	<b>6 points</b>	<b>10 points</b>	<b>/10</b>

<b>Quality *</b> For the quality of class participation, a functional camera and audio with minimal background noise are expected.	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.	
	<b>4 points</b>	<b>6 points</b>	<b>10 points</b>	<b>/10</b>
<b>Listening</b>	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.	
<b>Total points</b>				<b>/40</b>

*Adapted from Carnegie Mellon*

**Instructor-Initiated Recording of Class:** Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

**In-class Recording by Students:** 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 educational 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 delivered by any 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 presentations 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 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.

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.*

### **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/process/student-conduct-honor-code>.

**Use of artificial intelligence (AI) tools:** Note that the accuracy and credibility of information from AI-based platforms (e.g., ChatGPT) have been questioned. 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.

**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/](http://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.

**Whole Gator app:** <https://studentlife.ufl.edu/wholegator/>

### **Health and Wellness**

- U Matter, We Care: If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit U Matter, We Care website (<https://umatter.ufl.edu/>) to refer or report a concern and a team member will reach out to the student in distress.
- Counseling and Wellness Center: Visit the Counseling and Wellness Center website (<https://counseling.ufl.edu/>) or call 352-392-1575 for information on crisis services as well as non-crisis services, including Groups and Workshops, Outreach and Consultation, Self-Help Library and Wellness Coaching.

- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit the Student Health Care Center website (<https://shcc.ufl.edu/>).
- University Police Department: Visit UF Police Department website (<https://police.ufl.edu/>) or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website (<https://ufhealth.org/emergency-room-trauma-center>).
- GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website (<https://gatorwell.ufsa.ufl.edu/>) or call 352-273-4450.

### **Academic Resources**

- E-learning technical support: Contact the UF Computing Help Desk (<https://helpdesk.ufl.edu/>) at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).
- Career Connections Center (<https://career.ufl.edu/>): Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- Library Support (<https://uflib.ufl.edu/find/ask/>): Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center (<https://teachingcenter.ufl.edu/>): Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
- Writing Studio (<https://writing.ufl.edu/writing-studio/>): 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- Student Complaints On-Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-studentconduct-code/>.

**Course Evaluation:** Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.

**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.

**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)

<b>Classes/Dates</b>	<b>Topics</b>	<b>Notes</b>
1 (8/22, R)	<ul style="list-style-type: none"> <li>• Class overview</li> <li>• Research question formulation</li> </ul>	
2 (8/27, T)	<ul style="list-style-type: none"> <li>• Introduction to Epigenomics (I)</li> </ul>	
3 (8/29, R)	<ul style="list-style-type: none"> <li>• Introduction to Epigenomics (II)</li> <li>• Research critique – the basics</li> </ul>	
4 (9/3, T)	<ul style="list-style-type: none"> <li>• Quiz 1</li> </ul>	
5 (9/5, R)	<ul style="list-style-type: none"> <li>• Vitamins and epigenomics (I)</li> </ul>	
6 (9/10, T)	<ul style="list-style-type: none"> <li>• Vitamins and epigenomics (II)</li> </ul>	
7 (9/12, R)	<ul style="list-style-type: none"> <li>• Quiz 2</li> </ul>	
8 (9/17, T)	<ul style="list-style-type: none"> <li>• Update of literature research</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 1 Due at 11:59 pm – the approach and justification of paper choice</li> </ul>
9 (9/19, R)	<ul style="list-style-type: none"> <li>• Minerals and epigenomics (I)</li> </ul>	
10 (9/24, T)	<ul style="list-style-type: none"> <li>• Minerals and epigenomics (II)</li> </ul>	
11 (9/26, R)	<ul style="list-style-type: none"> <li>• Quiz 3</li> </ul>	
12 (10/1, T)	<ul style="list-style-type: none"> <li>• Research critique &amp; Paper 1a</li> </ul>	
13 (10/3, R)	<ul style="list-style-type: none"> <li>• Research critique &amp; Paper 1b</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 2 Due at 11:59 pm – the summary and snapshot for paper 1</li> </ul>
14 (10/8, T)	<ul style="list-style-type: none"> <li>• Macronutrients and epigenomics (I)</li> </ul>	

15 (10/10, R)	<ul style="list-style-type: none"> <li>• Macronutrients and epigenomics (II)</li> </ul>	
16 (10/15, T)	<ul style="list-style-type: none"> <li>• Quiz 4</li> </ul>	
17 (10/17, R)	<ul style="list-style-type: none"> <li>• Research critique &amp; Paper 2a</li> </ul>	
18 (10/22, T)	<ul style="list-style-type: none"> <li>• Research critique &amp; Paper 2b</li> </ul>	<ul style="list-style-type: none"> <li>• Assignment 3 Due at 11:59 pm – the summary and snapshot for paper 2</li> </ul>
19 (10/24, R)	<ul style="list-style-type: none"> <li>• Working on the final project &amp; Q/A (I)</li> </ul>	<ul style="list-style-type: none"> <li>• Project outline</li> </ul>
20 (10/29, T)	<ul style="list-style-type: none"> <li>• Epigenomics in diabetes &amp; obesity (I)</li> </ul>	
21 (10/31, R)	<ul style="list-style-type: none"> <li>• Epigenomics in diabetes &amp; obesity (II)</li> </ul>	
22 (11/5, T)	<ul style="list-style-type: none"> <li>• Epigenomics in aging and CVD (I)</li> </ul>	<ul style="list-style-type: none"> <li>• Dr. Larissa Strath</li> </ul>
23 (11/7, R)	<ul style="list-style-type: none"> <li>• Epigenomics in aging and CVD (II)</li> </ul>	<ul style="list-style-type: none"> <li>• Dr. Larissa Strath</li> </ul>
24 (11/12, T)	<ul style="list-style-type: none"> <li>• Working on the final project &amp; Q/A (II)</li> </ul>	<ul style="list-style-type: none"> <li>• Project layout</li> </ul>
25 (11/14, R)	<ul style="list-style-type: none"> <li>• Epigenomics in cancer</li> </ul>	
26 (11/19, T)	<ul style="list-style-type: none"> <li>• Working on the final project &amp; Q/A (III)</li> </ul>	<ul style="list-style-type: none"> <li>• Refining projects</li> </ul>
27 (11/21, R)	<ul style="list-style-type: none"> <li>• Quiz 5</li> </ul>	
28 (11/26, T)	<ul style="list-style-type: none"> <li>• Holiday</li> </ul>	
29 (11/28, R)	<ul style="list-style-type: none"> <li>• Holiday</li> </ul>	

30 (12/3, T)	<ul style="list-style-type: none"> <li>• Position Paper/Research Proposal presentation</li> </ul>	
31 (12/5, R)	<ul style="list-style-type: none"> <li>• Reading day</li> </ul>	<ul style="list-style-type: none"> <li>• Papers due at 11:59 pm</li> </ul>

### Suggested reading materials

- [1] Kowluru RA, et al. Epigenetic modifications in diabetes. *Metabolism* 2022, 126: 154920.
- [2] Cheng, et al. Epigenetic reprogramming in metabolic disorders: nutritional factors and beyond. *J Nutr Biochem*. 2018, 54:1-10.
- [3] Keller M, et al. Genetics and Epigenetics in Obesity: What Do We Know So Far? *Curr Obes Rep* 2023, 12(4):482-501.
- [4] Strath LJ, et al. Socioeconomic Status, Knee Pain, and Epigenetic Aging in Community-Dwelling Middle-to-Older Age Adults. *J Pain* 2024, 25(2):293-301
- [5] Moody L, et al. Perinatal phthalate and high-fat diet exposure induce sex-specific changes in adipocyte size and DNA methylation. *J Nutr Biochem*. 2019, 65:15-25.
- [6] Sun L, et al. Metabolic reprogramming and epigenetic modifications on the path to cancer. *Protein Cell* 2021, doi: 10.1007/s13238-021-00846-7.
- [7] Fanucchi S, et al. The intersection of epigenetics and metabolism in trained immunity. *Immunity* 2021, 54(1):32-43.
- [8] Krolevets M, et al. DNA methylation and cardiovascular disease in humans: a systematic review and database of known CpG methylation sites. *Clin Epigenetics* 2023, 15(1): 56.
- [9] Chen JF, et al. The roles of epigenetics in cancer progression and metastasis. *Biochem J* 2021, 478(17): 3373-3393.