



Biochemistry 104
Molecules to Life and the Nature of Science
Spring 2023

COURSE INFORMATION:

Course credits: 3

Course Designations and Attributes

Breadth - Biological Sci. counts toward the Natural Science requirement
L&S credit at the Elementary Level

Course Description:

The evolutionary path that led to the great diversity of life (including human) on our planet works at the molecular level. Understanding how cells carry out these molecular functions will lead into discussing current topics in the news such as: exploring the human genome to understand our species' history and to diagnose and treat disease; genetic engineering of crops in relation to foods safety and effects on ecosystems; gene editing of insects and mammals including humans; how to determine whether herbal remedies, vaccines, etc. are effective and safe; and current trends in biotechnology and what might be on the horizon. A major goal of this course is for students to appreciate the nature of science and to become better equipped to explore and evaluate scientific topics of interest to them.

Course Requisites

None

Meeting Time and Location

TR, 2:30 pm-3:45 pm
Room 1420 in the Microbial Sciences Building,
1550 Linden Dr, Madison, WI 53706

Instructional Modality

In-person

Instructor Contact Information:

Dr. Richard Amasino

Office Hours: after class or by appointment (email)

Room 215B, DeLuca Biochemistry Laboratories, 433 Babcock Dr.

amasino@biochem.wisc.edu

Dr. Mario Pennella

Office Hours: after class or by appointment (email)

Room 1142E, DeLuca Biochemistry Building, 420 Henry Mall

mpennella@wisc.edu

Course Learning Outcomes:**LEARNING OUTCOMES**

1. Understand the nature of science and what science can tell us.
2. Gain an appreciation for the beauty and the remarkable diversity of life on earth.
3. Understand the evolutionary process and the molecular basis of how cells and organisms operate.
4. Appreciate the range of how science is presented and sometimes misrepresented.
5. Develop a scientific approach to decision making.

Credit Hour Designation

This class meets for two, 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of the classroom for every class period.

Regular and Substantive Student-Instructor Interaction

Each unit instructor will be available for direct interaction 3-4 hours each week. This includes during scheduled class times and via appointments.

INSTRUCTOR TO STUDENT COMMUNICATION:

Grading

Quizzes	50%
Assignments	50%
Total	100%

Grading Scale

A = 90 – 100%

AB = 86 – 89.9%

B = 80 – 85.9%

BC = 76 – 79.9%

C = 65% – 75.9%

D = 55% – 64.9%

F = 0% – 54.9%

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

No formal textbook is required for this course. Course material (chapter excerpts, papers, websites, etc.) will be provided on the course website and/or in-class.

ASSIGNMENTS AND QUIZZES

Assignments: Due dates for assignments will be provided on Canvas and/or when they are assigned during class.

Quizzes: All quizzes will be taken through Canvas. Due dates for quizzes are listed in the schedule (later in syllabus). For quizzes you will have two attempts and may use any resource (notes, books, websites, etc.).

Class Schedule – Spring 2023 – Biochemistry 104

*Tentative - Topics and assignments could change during semester.

Instructors will provide notice of changes. Assignments will be due through Canvas. Instructor will announce due dates in class and on Canvas.

Class	Topic	Day	Date	Assignment or Quiz Due
1	Unit 1: Introduction to Molecules of life; Overview	Tue	Jan. 24	
2	What happens when a nobel laureate is not reliable	Thur	Jan. 26	Assignment by 11 AM
3	Cure-all: Apple Cider Vinegar. “Molecules and water and buffers, oh my”	Tue	Jan. 31	Quiz – classes 1 and 2
4	Enzyme discovery and celiac disease	Thur	Feb. 2	
5	Innocence Project: DNA and forensics	Tue	Feb. 7	Quiz – classes 3 and 4
6	Genetic genealogy, privacy	Thur	Feb. 9	
7	Mutations and Cancer	Tue	Feb. 14	Quiz – classes 5 and 6
8	Unit 2: Evolution What is human?	Thur	Feb. 16	
9	That’s really my ancestor?	Tue	Feb. 21	Quiz – class 8
10	“Tree of life”	Thur	Feb. 23	
11	“Your inner fish”	Tue	Feb. 28	Quiz – classes 9 and 10
12	“Your inner monkey”	Thur	Mar. 2	
13	Human origins	Tue	Mar. 7	Quiz – classes 11 and 12
14	How evolution shaped us	Thur	Mar. 9	

	No Class	Tue	Mar. 14	Spring Break Recess
	No Class	Thur	Mar. 16	Spring Break Recess
15	Unit 3: Eugenics	Tue	Mar. 21	
16	Precision medicine's future?	Thur	Mar. 23	
17	If not antibiotics, then what?	Tue	Mar. 28	Quiz – classes 15 and 16
18	Microbiome and probiotics	Thur	Mar. 30	
19	Cystic Fibrosis: how a faulty membrane protein leads to serious disease	Tue	Apr. 4	Quiz – classes 17 and 18
20	Cardiovascular Disease: Fats, sugars, what can I eat?	Thur	Apr. 6	
21	Viruses	Tue	Apr. 11	Quiz – classes 19 and 20
22	Unit 4: Bio-engineering and technology From smallpox to COVID-19	Thur	Apr. 13	
23	Vaccine controversies	Tue	Apr. 18	Quiz – class 22
24	Vaccines to misinformation and genetic engineering	Thur	Apr. 20	
25	Engineering humans and making organs from yourself	Tue	Apr. 25	Quiz – classes 23 and 24
26	Engineering animals and crops	Thur	Apr. 27	
27	Microbes and climate change	Tue	May 2	Quiz – classes 25 and 26
28	Student request	Thur	May 4	

ACADEMIC POLICIES AND STATEMENTS:

Course Accessibility: The teaching team strives to provide everyone the opportunity to learn biochemistry. Please let Dr. Mario Pennella (mpennella@wisc.edu) know if you have additional learning considerations relating to the curriculum, instruction, or assessment of this course that will enable you to engage in the course more fully. We will keep any information you share with us confidential. *If you are a student requesting accommodations through the McBurney Center, see statement below and please contact the course coordinator to discuss your accommodations.*

Teaching & Learning Data Transparency Statement: The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully evaluates and vets all campus-supported digital tools used to support teaching and learning, to help support success through **learning analytics**, and to enable proctoring capabilities. View the university's full **teaching and learning data transparency statement**.

Privacy of Student Records & the Use of Audio Recorded Lectures Statement:

View [more information about FERPA](#).

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record lectures without permission unless you are considered by the university to be a qualified student with a disability who has an approved accommodation that includes recording. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities, with the exception of sharing copies of your personal notes as a notetaker through the McBurney Disability Resource Center. Students are otherwise prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes

copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

Campus Resources for Academic Success:

- [University Health Services](#)
- [Undergraduate Academic Advising and Career Services](#)
- [Office of the Registrar](#)
- [Office of Student Financial Aid](#)
- [Dean of Students Office](#)
- [Graduate Student Services](#)

Course Evaluations:

Students will be provided with an opportunity to evaluate this course and your learning experience. We strongly encourage you to participate in the course evaluation.

Digital Course Evaluation (AEFIS):

UW-Madison now uses an online course evaluation survey tool, [AEFIS](#). In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously. Your participation is an integral component of this course, and your feedback is important. I strongly encourage you to participate in the course evaluation.

STUDENTS' RULES, [Rights & Responsibilities](#)

Diversity and Inclusion Statement: [Diversity](#) is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by

creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

Academic and Integrity Statement: By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary [sanctions](#) include, but are not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

Accommodations for Students with Disabilities: The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy ([UW-855](#)) require the university to provide reasonable accommodations to students with disabilities to access and participate in its academic programs and educational services. Faculty and students share responsibility in the accommodation process. Students are expected to inform faculty of their need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations. Faculty will work either directly with the student or in coordination with the McBurney Center to provide reasonable instructional and course-related accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: [McBurney Disability Resource Center](#))

[Academic Calendar & Religious Observances](#)