湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	Principles of Biology
Course Code	BIOL 1101
Semester	Summer 2025
Course Length	5 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	N/A

Course Description:

This course provides a survey of fundamental biological principles. Emphasis is placed on basic chemistry, biochemistry, cell biology, metabolism, genetics, population genetics and history and classification of life forms, evolution, ecology, diversity, and other related topics. Laboratory exercises are designed to illustrate the basic principles presented in lectures.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical thinking skills** – Students will engage in creative and/or innovative thinking, and/or inquiry, analysis, evaluation, synthesis of information, organizing concepts, and constructing solutions.
- **Communication skills** – Students will demonstrate effective written, oral, and visual communication.
- **Teamwork** – Students will demonstrate the ability to work effectively with others to support a shared purpose or goal and consider different points of view.
- **Social responsibility** – Students will demonstrate intercultural competency and civic knowledge by engaging effectively in local, regional, national, and global communities.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- articulate the fundamental characteristics of living organisms and the scientific methods used to study them;
- explain the cell theory, describe prokaryotic and eukaryotic cell structures, and analyze how cellular components contribute to function;

- illustrate how organisms acquire, transform, and utilize energy through metabolic pathways, including photosynthesis and cellular respiration;
- describe DNA replication, gene expression, and inheritance patterns, and connect these processes to evolutionary change;
- trace the evidence for evolution, interpret phylogenetic relationships, and evaluate how natural selection drives biodiversity;
- identify how organisms interact with their environment and the role of abiotic/biotic factors in shaping ecosystems.

Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:
Urry, Cain, Wasserman, Minorsky, Reece. *Campbell Biology*, 11th edition. Pearson.

Course Requirements:

Participation and Discussion (10%):
Active participation in class discussions, group activities, and laboratory sessions is essential. Students are expected to contribute thoughtfully, ask questions, and engage with peers and instructors. Participation will be assessed based on attendance, engagement, and the quality of contributions.

Quizzes (15%):
Quizzes will be administered periodically to assess students' grasp of key concepts covered in lectures and readings. These quizzes are designed to reinforce learning, provide immediate feedback, and help students identify areas for improvement.

Laboratory Assignments (25%):
The laboratory component of this course is critical for understanding biological principles through practical, hands-on experience. Students will conduct experiments, collect and analyze data, and submit detailed lab reports. Lab reports will be graded based on accuracy, clarity, depth of analysis, and proper use of scientific methodology.

Midterm Exam (20%):
The midterm exam will test students' knowledge of the material covered in the first half of the course. It will include multiple-choice questions, short answers, and essay questions that assess both factual knowledge and critical thinking.

Final Exam (30%):
The final exam is cumulative, covering all topics discussed throughout the course. It will include various question formats to evaluate students' comprehensive understanding, ability to synthesize information, and application of biological concepts to real-world problems.

Assessments: Activity	**Percent Contribution**
Participation and Discussion	10%
Quizzes	15%
Laboratory Assignments	25%
Midterm Exam	20%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Percentage of available points	**Grade**
90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
＜60	F

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, and major ones provided in writing.

BIOL 1101 Schedule		
Lecture	Topic	Readings & Labs
L1	Exploring Biology	Ch. 1-2
	The Chemical Context of Life	
L2	Water and Life	Ch. 3-4
	Carbon and the Molecular Diversity of Life	
L3	Structure and Function of Large Biological Molecules	Ch. 5, 7
	Membrane Structure and Function	Lab 1
L4	An Introduction to Metabolism	Ch. 8-9
	Cellular Respiration	
L5	Fermentation	Ch. 9-10
	Photosynthesis	**Quiz 1**
L6	Cell Communication	Ch. 11
		Lab 2
L7	The Cell Cycle	Ch. 12
L8	Molecular Basis of Inheritance	Ch. 16
L9	Mendel and the Gene Idea	Ch. 14-15
	The Chromosomal Basis of Inheritance	
L10	Gene Expression: From Gene to Protein	Ch. 17
		Quiz 2
L11	Regulation of Gene Expression (Prokaryotes)	Ch. 18, 27
L12	Regulation of Gene Expression (Eukaryotes)	Ch. 18, 21
	Genomes and Their Evolution	
/	**Midterm Exam**	/
L13	DNA Tools and Biotechnology	Ch. 20
		Lab 3
L14	Descent with Modification: A Darwinian View of Life	Ch. 22-24
	The Evolution of Populations	
	The Origin of Species	
L15	The History of Life on Earth	Ch. 25-26
	Phylogeny and the Tree of Life	**Quiz 3**
L16	Bacteria and Archaea	Ch. 27-28
	Protists	Lab 4
L17	Plant Diversity I: How Plants Colonized Land	Ch. 29
L18	Plant Diversity II: The Evolution of Seed Plants	Ch. 30
L19	Angiosperm Reproduction and Biotechnology	Ch. 38

L20	Plant Structure, Growth and Development	Ch. 35-36
	Resource Acquisition and Transport in Vascular Plants	**Quiz 4**
L21	Resource Acquisition and Transport in Vascular Plants (continued)	Ch. 31, 36-37
	Soil and Plant Nutrition	Lab 5
	Fungi	
L22	Overview of Animal Diversity	Ch. 32, 47
	Animal Development	
L23	An Introduction to Invertebrates	Ch. 33-34
	The Origin and Evolution of Vertebrates	
L24	The Origin and Evolution of Vertebrates (continued)	Ch. 34, 40
	Animal Form and Function	
L25	Animal Nutrition	Ch. 41-42
	Circulation and Gas Exchange	**Quiz 5**
	Final Exam	/

Accommodation Statement

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

Lab Policies

- **Attendance:** Attendance at all lab sessions is mandatory. Missing a lab without a valid excuse will result in a grade penalty.
- **Late Reports:** Late lab reports will incur a 10% penalty per day.
- **Safety:** Proper lab attire (lab coat, gloves, safety goggles) is required at all times. Failure to follow safety protocols may result in dismissal from the lab.
- **Academic Integrity:** Plagiarism and fabrication of data will not be tolerated and will result in disciplinary action.

Lab Materials

- Lab manual (provided during class).

- Lab notebook for recording data and observations.
- Personal protective equipment (lab coat, gloves, safety goggles).

Attendance and Expectations
All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates
All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work
The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs and Disabilities
Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.