

Biology 1510 – Basic Life Mechanisms

Winter 2019

Course website: canvas.wayne.edu/courses/102334

Instructor: Dr. Karen Myhr

Office Location: 2113 Biological Sciences Building

E-mail: kmyhr@wayne.edu

Office Phone: 313-577-1504 (email is more effective, phone often goes to voicemail on email)

Dr. Myhr's office hours are from 1:30 to 3:30 pm on Thursdays in the STEM Commons in the Kresge Library, and from 2 to 3 pm in Room 2113 in the Biological Sciences Building. See page 2 for details.

Lectures are 11:30 am to 12:20 pm on Monday, Wednesday and Friday in General Lectures Rm 100.

Lab sections meet in Science Hall.

Materials: Access to *Biology* by Raven, Johnson, et al., 11th edition; and an Iclicker2 are required for lecture. The lab requires a lab manual that is only available at the WSU Barnes & Noble.

Objectives: The overall objective of the course is for students to demonstrate an understanding of the basic mechanisms of life. To this end, the course will use textbook reading, homework assignments, interactive lectures, demonstrations and labs to cover major topics in modern biology. For the lecture, you will demonstrate your understanding on multiple-choice questions, in homework and during in-class activities. (Extended Learning Objectives are on pages 8 and 9.)

Students will describe and apply:

1. how inheritance and mutations are critical for **evolution**
2. how **structures** of molecules, cells and tissues relate to their **functions**
3. how **information** flows in cells in signal transduction pathways, from DNA to RNA to proteins, and in the mitotic and meiotic cell cycles; and how biological information can be modified by mutations and biotechnology
4. how **energy and matter are transformed** in cellular respiration and photosynthesis
5. how the components of cells interact as **systems** to generate emergent properties
6. how **science is based on evidence** and makes predictions
7. biological data and interpret it **qualitatively, quantitatively, and with graphs**
8. scientific ideas multiple ways – in discussions, in written paragraphs, in drawings and in graphs – to be able to **communicate across disciplines**
9. how science informs the decisions of a **society**, such knowing about cell signaling, mutations and inheritance; and how science, such as biological engineering, creates opportunities that require informed citizens and policies

The lab is an integral part of this course. Dr. Myhr will assign the one grade that will be given for the four-credit course that includes the lecture and the lab. The lab is directed by Michelle Serreyn. You will have a TA for your lab. **For lab questions, contact your TA first, then Ms. Serreyn, if necessary. The exceptions are contacting Ms. Serreyn first for Student Disability accommodations and online lab homework.** In Canvas you will have two course sites; one for lecture (Dr. Myhr), one for lab.

CONTACT INFORMATION AND GETTING HELP

Office Location for Dr. Myhr: 2113 Biological Sciences Building

E-mail: kmyhr@wayne.edu

Office Phone: 313-577-1504 (email is more effective)

Office Hours: Office hours are the time I have set aside to meet with students. They are the best time to talk about your questions on biology content or issues that are specific to you, such as concerns about the course, study strategies, grade problems, special needs or careers. **Dr. Myhr's office hours** are 1:30 to 3:30 pm in the STEM Commons in the Kresge Library, and from 2 to 3 pm on Mondays in Room 2113 in the Biological Sciences Building (maps.wayne.edu/). You do not need an invitation or appointment to come to scheduled office hours. If you cannot make office hours, email kmyhr@wayne.edu for an appointment at least 24 hours in advance, suggesting three times that you are available.

Email: See the email guidelines in General Policy 5. Email is a good way to communicate with Dr. Myhr about issues that do not require a discussion. These include letting me know about **chronic** clicker or Canvas problems, or emailing me with documentation about missing class for things like representing WSU on teams. I cannot answer questions on biology content or study strategies by email, because these require discussions. I do not answer emails about issues that are covered in the syllabus, in Canvas or that were adequately covered in lecture.

Discussions in Canvas: Discussions in Canvas is a good alternative for simple content questions. There will be topics for discussing logistics, homework, quizzes and exams.

In the lecture hall before or after class: Sometimes I will be in the lobby before class. This is a fine time for questions with quick answers, but there usually is not time for long discussions. I have limited time to set up before class and get out of the way after class for the next class. When I am at the podium setting up, I need to set up and cannot answer even quick questions. I can often take questions after class, but we will have to go to the lobby to accommodate the next class, and because conversations at the podium may be recorded and broadcast.

Teams: You will join a team for support in the course. Even if you opt out of joining a team that meets outside of class, you will join a team to sit with during lecture. See more in Canvas.

Academic Success Center: There will be tutoring and workshops in the Academic Success Center. See <http://success.wayne.edu/> and future posts on Canvas for more information.

WSU Computing and Information Technology (C&IT): I am not trained to provide technical computing support. For free help with campus computing, including email, Canvas, EchoCapture or your AccessID call (313) 577-4778, see computing.wayne.edu/ or email csthelph@wayne.edu.

Lecture Recording: C&IT will record lectures and create a link in Canvas under Echo360 Recordings, but it sometimes fails. You are welcome to record lecture on your own for your own use.

Lab: Michelle Serreyn (ac3042@wayne.edu) directs the lab. **In general, contact your TA first for lab questions, then Ms. Serreyn, if necessary. The exceptions are contacting Ms. Serreyn first for Student Disability accommodations and online lab homework.**

Exams: Lecture exams will consist of multiple choice questions. The four unit exams will each be worth 125 points (36 questions, each 3.5 points). The cumulative final exam will be worth 250 points.

I will **automatically** drop the lowest unit exam score, which may be a zero for a missed exam. I do not need documentation for a missed exam (or class). There will not be make-up exams for any personal reasons. If you have a University event, jury duty, court date, or required military service during an exam, please email kmyhr@wayne.edu at least one week before the exam. **Do your best on each exam. If you miss an exam later in the semester, only one lowest exam will be dropped.** The final exam cannot be dropped or replaced with another assignment.

Exam policies are in place to make exams go smoothly so you have as much time as possible, and to maintain the value of your grades by preventing cheating. **BEFORE you enter the room for an exam, all notes, books, food, drinks, and electronics (including, but not limited to phones, earphones, earbuds, cameras, smart watches and regular watches) need to be put away in a closed bag. No earplugs are allowed during the exam.** You should have sharpened #2 pencils, erasers and your OneCard out. You may also use highlighters and colored pens or pencils, if you wish. Once you enter the exam room you must follow the proctors' instructions and sit where they tell you to. We will provide the answer sheets and questions. **Once you get up, you must turn in your exam without writing any more.** Refer to Canvas and class announcements for more details.

Homework And Quizzes: Your homework and quizzes for the semester will be free in Canvas. You will have a homework assignment **due before each class for preparation and quizzes to review material.** The purpose of the preparation homework is to help you prepare for class, and to let me know what we need to spend the most time on in class. Some of the homework will prepare you for lecture; some will help you reflect on how you are doing and how to continuously improve. You will earn up to 1 point for each homework assignment. There will be at least 45 point opportunities.

To help you prepare for exams you will complete quizzes in Canvas. There will be about one quiz per Chapter and a cumulative quiz for each unit to prepare for the exam. For the Final Exam there will be review quiz for each unit, and a course cumulative quiz. Each quiz will be worth up to 2 points. There will be at least 28 quizzes throughout the semester, with 56 point opportunities.

For homework and quizzes you will have unlimited attempts before the deadline. **You may work with other students or peer mentors in person or the Discussions board in Canvas, look in your book or use other resources as you do your homework and review assignments.** This is not cheating because the purpose of these assignments for you to learn, not for me to evaluate you individually. If there is a short-answer question, you need to answer in your own words, but you may discuss the ideas with other students first.

To take into account occasional technical failures or personal reasons to miss an assignment, only 40 of the homework and 50 of the quiz points will count towards your grade. This automatically allows for missing an occasional quiz or homework assignment without you needing to provide an excuse. I assume students who miss quizzes have a good reason. Using this system, you can still earn perfect homework and quiz grades even if you have a good reason to miss a few of the points. **Because this system automatically takes into account missed assignments, I do not extend deadlines for individuals or give individual make-up homework opportunities.**

Practicing answering fill-in-the-blank and multiple choice questions is a good way to study because you are practicing recall, not just recognition of material. It can also give you feedback on what you need to study more of. **But this is not enough.** You need to have a rich understanding of the material so that you can put it in your own words and pictures. You should be able to explain why each multiple choice answer is right or wrong. In addition, the **learning objectives** at the end of this syllabus and in Canvas will guide you through this process. **To earn an A or B in the course, before each exam you will need to be able to complete each learning objective for the unit from memory so that another student could earn an A from just your answers.**

Clickers:

I expect you to come to class prepared and participate actively while in class. To give you a short-term incentive to participate, you will earn points by answering questions with your i>clicker2. **You will earn 1 point for each day of lecture that you answer most of the questions. You do not need to be correct to earn credit,** because class is for learning, not evaluation. There will be 38 lectures, but a maximum of 35 points will count towards your grade. This systematically takes into account clicker problems or personal reasons to miss class. There is no other accommodation for missed classes or clickers that are forgotten, out of batteries, broken or lost. **There is no other accommodation for missing class for personal or other reasons, including but not limited to illness, funerals, personal travel, family travel, family obligations or weddings. If you will miss class for jury duty, court dates, or official University activities, please email me at least a week in advance.**

You should start using your clicker as soon as possible, even if you have not registered it. Once you register your clicker in Canvas, the points assigned to your clicker will transfer to your name. I have no way to know which clicker is yours unless you **register in Canvas.** Registering at the i>clicker website will not register your clicker for this class, but it will not cause any problems if you do register there. **If you get a new clicker during the semester, register the new number in Canvas.** You may share a clicker with someone who is not in this lecture. We are not using Iclicker GO or REEF because it is more expensive for students overall. If you have chronic clicker problems or trouble registering your clicker in Canvas, email your clicker number to kmyhr@wayne.edu. **It is a violation of the student code of conduct to possess someone else's clicker in class if they are not currently sitting right next to you, even if you do not use their clicker. See policy #7 below.**

Lab: There will be 250 points for lab. Please refer to your lab syllabus for more details. The lab syllabus is available on the door of the lab in Science Hall.

Grades:	Exam 1 (1/30/2019)	125
	Exam 2 (2/20/2019)	125
	Exam 3 (3/20/2019)	125
	Exam 4 (4/17/2019)	125
	Drop Lowest Hourly Exam	-125
	Final exam (4/29/2018, start at 10:15 am)	250
	Homework (Lecture preparation)	40
	Clicker Participation	35
	Quizzes	50
	<u>Lab</u>	<u>250</u>
	Total	1000 points

All exams will be held in General Lectures 100, unless otherwise noted in class and on Canvas. **Unit exams are all on Wednesdays during lecture time on the dates listed above. The final exam is on Monday, April 29, from 10:15 am until 12:15 pm.** The University final exam calendar and rules are available online. The URL sometimes changes, but you can search on "WSU, Wayne, finals schedule" to find the current schedule.

Grading Policy: Grades will be based on 1000 points total, 750 from lecture exams and 250 from lab points. I do not curve grades. This is to encourage you to work together so everyone learns more. There is no extra credit because extra credit detracts from the core learning objectives. Grades will be calculated on the following scale:

	A	92.5-100%	A-	90.0-92.4%	
B+	87.5-89.9%	B	82.5-87.4%	B-	80.0-82.4%
C+	77.5-79.9%	C	72.5-77.4%	C-	70.0-72.4%
D+	67.5-69.9%	D	62.5-67.4%	D-	60.0-62.4%
	F	0-59.9%			

Exception for students registered for three credits: A few engineering students are registered for a three-credit version of this course without the lab. At the end of the semester, their grades will be calculated on the same percentage scale, but out of the 750 lecture points, without the lab points.

General Policies:

1) **Missing Class.** Students are expected to attend every class and lab in person. If you are going to miss class, please see the grading policies above. I do NOT give individual extensions or exceptions for personal reasons, including but not limited to hospitalization, illness, travel, weddings, transportation problems, weather, funerals, dependent care or family obligations. The general course policies systematically take into account that sometimes students will need to miss one or two classes.

There are exceptions for Student Disability accommodations, and civic duties. If you have a disability please see general policy 3 below. If you have jury duty, a court date, or military obligation during lecture or an exam, please email kmyhr@wayne.edu at least a week ahead of time, so we can try to accommodate.

2) **Electronic Devices and Professional Behavior.** Professional behavior is expected in lecture and labs, which includes respecting your classmates by arriving on time, not having distractions on electronic devices and not talking. All students must show respect in language and attitude towards the instructors and their fellow students. You are encouraged to discuss differences of opinion with each other, respectfully. Disrespectful students will be asked to move seats or leave the lecture or lab, and may lose their opportunity to turn in any missed assignments or earn any points for the day. Only students registered for the course may attend labs or lecture. Children may not attend class.

During lecture, electronic devices may ONLY be used for the purposes of the class, such as taking notes. Electronic devices in class can be useful tools, but too often they are distractions to you and those around you. The consequences for misusing an electronic device in class will be that we will require you to put away your electronics, or we will take your device to return at the end of class. **You will lose your participation (clicker) points for the day, unit, or semester.**

3) Any **special considerations** (disabilities, religious holiday conflicts, etc.) must be emailed to kmyhr@wayne.edu by January 18, 2019 or as soon as possible as the situation arises. There is no retroactive accommodation from when I know of the issue. You need to register documented disabilities with Student Disability Services for coordination of your academic accommodations. They need a week or more to arrange accommodations, so make an appointment early. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTY: telecommunication device for the deaf; phone for hearing impaired students only).

Once you have your accommodations in place, I will be glad to meet with you privately **during my office hours** to discuss your special needs. **You need bring your paperwork to office hours so I can process it and give you the answer sheets if you will need alternate testing. If you need an accommodation for lab, you will need to take paperwork to Michelle Serreyn, who coordinates the labs, in addition to working with me.** Please refer to the SDS website for further information about students with disabilities and the services we provide for faculty and students: studentdisability.wayne.edu/ **If your disability requires you to sit in a certain part of the classroom, please sign up for a team that meets your needs. If you have a concern about seating in the lecture hall, for example you have a disability that requires you to sit at the tables in the back, please email kmyhr@wayne.edu as soon as possible so we can make arrangements.**

4) If you need to see Dr. Myhr and cannot come during office hours, you are welcome to set up an appointment by email. In order to schedule these appointments, you need to email kmyhr@wayne.edu at least 24 hours in advance. Please include three unique times that you can meet me. I cannot guarantee I will be available, but I try to meet the needs of all my students.

5) **Email guidelines:** I will not reply to emails when the answer can be found in the syllabus or on Canvas. Please post problems or questions of general interest, such as homework, quizzes or exam, in Discussions in Canvas. I am happy to answer biology content questions during office hours, but discussions by email do not work well. I will respond to most emails within **two business days**. After two business days, you may email me again. **Due to privacy laws and for professionalism you must email me from your WSU email account of Canvas.** I expect emails to be in a professional style, with your course number and a description of the issue (not your name) as the subject, a proper greeting, e.g. "Dear Professor Myhr," a proper salutation, e.g. "Sincerely, Chris Smith," correct punctuation

including capitalization and no texting abbreviations. Emails that do not follow these rules may take longer get a reply, may be returned for correction, or ignored. If I cannot figure out what you want, I cannot help you. Following these email guidelines even outside of this course will enhance your success at WSU and beyond.

6) Letters of recommendation are to give people an idea of who you are beyond the grades and classes on your transcript. I do not write letters for students who I only know from my classes. You are likely to need letters from professors. Start planning now how you will get involved on campus so you will have professors who know you well enough to write a letter for you. Examples of how you can get involved include doing research with a professor (urop.wayne.edu), joining a student organization (doso.wayne.edu/org-services), becoming a supplemental instructor (success.wayne.edu/pal/si/si-schedule), or joining a learning community as a member or peer mentor (wayne.edu/learning-communities/).

7) Anyone caught cheating will automatically receive a failing grade for the exam, assignment or course, and may be expelled from the University. You may only use your own clicker in class. **If you are caught with someone else's clicker in class, or someone else has your clicker in class you will both earn a zero for ALL of the clicker points for that unit or the whole semester, whether or not you used the clicker.**

For homework for this class, you may work with other people and look up answers while you are working. The point of the homework is to learn the material, so use homework to help you reach that goal. Knowing to get help during the learning phase is a sign of a good student, so this is not cheating. It is cheating to get or give help on evaluations, such as in-class exams. If you are not sure when you are allowed to get help in this or another class, please ask for clarification. For discussions of cheating see the "Student Code of Conduct," which can be found at doso.wayne.edu/assets/codeofconduct.pdf

Plagiarism includes using others ideas or words and not citing them properly. You are responsible for knowing what plagiarism is and what fair use is and how to cite properly. If you have questions ask your TA while there is time to do your assignments properly.

8) **Withdrawals:** January 18, 2019 is the last day you can drop the class and get your tuition refunded. The last day to drop this course is March 24, 2019. If you withdraw between January 19 and March 24, 2019, inclusive, you will receive a WN on your transcript if you never completed any assignment; a WP if you have greater than 60% of the points possible at the time of your request on exams, quizzes, homework and class participation; or a WF if you have less than 60% of the points possible at the time of your request. No exams or other grades are dropped in this calculation. Lab grades are not included in this calculation. In Academics: select "Course Withdrawal" from the Registration Menu under Student Resources. A *****SMART Check***** is required. After the registrar processes your request they send it to Dr. Myhr to assign a grade. This can take up to five business days. For the academic and registration calendar, see wayne.edu/registrar/registration/calendar18-19/

9) University closures will be publicized through:

- the university emergency broadcast system (broadcast.wayne.edu),
- WSU Homepage (www.wayne.edu),
- the University Newline (313) 577-5345,
- WDET-FM (Public Radio 101.9)

If the university is closed that includes lecture, labs, any learning community or team meetings, and office hours. If a unit exam is scheduled on a day when the University or lecture room is officially closed during class, the exam will be held during the next scheduled meeting of lecture that occurs when the University and room are open, or as indicated on our Canvas site. I will give you instructions through Canvas or WSU email as soon as possible if there is a closure or emergency. You will get instructions on how cancelled labs will be handled in the lab Canvas site.

10) For any and all issues not covered in this syllabus, refer to the “Student Code of Conduct,” which can be found at doso.wayne.edu/assets/codeofconduct.pdf

11) Updates to this syllabus and schedule may be posted on the course Canvas website at canvas.wayne.edu. You are responsible for checking Canvas announcements and your University email account. I recommend checking at least once each business day of a semester in which you are enrolled.

Semester Learning Objectives

I will post more detailed learning objectives by Chapter in Canvas through the semester. The objectives below are so you know now what you will be able to do when you successfully complete the lecture portion of this course.

Describe how deductive and inductive reasoning, reductionism, systems biology, hypotheses, theories, predictions and controls fit into the **scientific process**. **Identify experiments that would test** biological models or biological questions and **results that would support or refute** the models; for example germ theory, the fluid mosaic model, DNA replication, the principles of segregation and independent assortment, and possible mechanisms of diabetes and cancer. Analyze experiments that use cell labeling and microscopic techniques, gel electrophoresis, PCR, and genetic crosses.

Describe the unity and diversity of life, the characteristics of living organisms and the hierarchical organization of life. Compare **prokaryotes** to **eukaryotes**. Describe the **chemistry of life**, including the roles of chemical reactions, bonds and the common elements in living organisms; and the properties of water including the properties and significance of polarity, acids, bases, buffers and pH. Describe and compare the structures and functions of the four major macromolecules.

Describe the **chemistry of energy**, including redox reactions, potential and kinetic energy. Describe free energy and how it relates to endergonic and exergonic reactions. Describe the importance of **ATP** and coupled reactions. Describe activation energy, mechanisms and regulation of **enzyme** action, and regulated biochemical pathways.

Describe the **biology of energy processing** by comparing heterotrophs, autotrophs and photoautotrophs. Describe the fluid mosaic model. Describe and compare types of transport across membranes. Describe osmosis and tonicity and their significance. Describe the structure, function and evolutionary origins of mitochondria and chloroplasts. Describe **cellular respiration** and its importance, including glycolysis, the oxidation of pyruvate, the Krebs cycle and oxidative phosphorylation. Describe the state of carbon atoms and energy at the beginning and end of each stage. Describe variations of cellular respiration, including regulatory mechanisms, anaerobic metabolism,

and energy sources other than glucose. Describe the purpose of **photosynthesis**. Describe the mechanisms of photosynthesis, including pigments, photosystems, and the major steps of the two stages, the substrates, the energy input and output, and essential cycled chemicals. **Analyze the logic of the order of the steps of the carbon cycle as a system.**

Describe the **structure and replication of DNA**, including the antiparallel structure of DNA, semidiscontinuous replication, and the major proteins of replication. Describe the structure of **chromosomes and karyotypes**. Describe and compare **genes, alleles and chromosomes**. Describe **transcription and translation**, including ribosomes, codons, and the major complexes. Compare prokaryotic to eukaryotic transcription and translation, including post-transcriptional processing and the endomembrane system. Describe why and how **gene expression is regulated**, comparing prokaryotes to eukaryotes. Analyze how **mutations** can alter protein sequences.

Describe types and significance of **intercellular communication**. Compare the structures and mechanisms of intracellular receptors with cell-surface **receptors**, and receptor tyrosine kinases with heterotrimeric G protein-coupled receptors. Describe mechanisms of **intracellular signaling cascades**; including phosphorylation, small GTPases and second messengers. Given a signaling pathway, predict how manipulating one element will affect the others, and how knowing one lets you predict the others in a normal cell.

Describe the significance of and how **information** is passed **across generations of cells and organisms**. Describe the structure and function of the cytoskeleton, centrosomes, cell walls, extracellular matrix, cell-to-cell interactions, and flagella. Describe **cell division** in bacteria. Name, describe and analyze the logical order of the phases of the **mitotic cell cycle**, the stages of **mitosis**, and **cytokinesis**. Describe and compare the three **checkpoints** of the eukaryotic cell cycle. Predict what conditions would stop a cell at each checkpoint. Describe bulk transport. Name, describe and analyze the logical order the phases of the meiotic **cell cycle, meiosis and fertilization**, including its purpose for **sexual reproduction**. Describe synapsis and **crossing over**. Compare mitosis, meiosis I and II, focusing on metaphase.

Describe the methods, results and conclusions from Mendel's monohybrid and dihybrid crosses. Predict the results of crosses. Describe six ways that traits can be non-Mendelian, and include examples. **Relate the principles of inheritance to meiosis, fertilization, gene expression and the regulation of gene expression.**