

# Bio2500: Fundamentals of Cell Biology for Neuroscience

F2020

## ON-LINE: Synchronous

TTH 10 - 11:15 am

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NOTE: Due to Covid19 precautions, both lecture and discussion sessions are being held synchronously on-line during lecture and discussion time periods. Class exams, on dates indicated below, will occur synchronously during the normal lecture period (Tues or Thurs. 10-11:15 am or part thereof). Exams will require the use of a Lockdown Browser as well as a web camera.

**Description and Objective:** The brain is made up of cells, the fundamental unit of life. As neuroscientists, to understand the brain you need to have an in depth understanding of cells. Indeed, this class is a foundational class for any Neuroscience major or minor. By looking closely at the structure and function of each intracellular organelle, as well as specific classes of proteins, this course will help you develop a model of neurons and glial cells as the living machines underlying brain function. While neurons and glia will be emphasized, other cell types are discussed when they best illustrate important principles of cell function and activity.

**Learning objectives:** Our bodies are made of living cells that work by following a number of basic chemical and physical principles. Our goal is to develop a *deep* understanding of how and why cell's work the way that they do. Indeed, we will spend considerable time looking in depth at the mechanistic processes by which a cell operates. Put another way: yes, we learn lots of vocabulary (the what of things), but we will also focus attention on the "when, where, how and why" of things. This requires considerable, detailed, discussion, of basic principles spanning ions and molecules, macromolecules, organelles and cell communities. The depth of our study is highlighted by the formal learning objectives of this class:

- (1) describe the basic structure of a eukaryotic cell and its different compartments (organelles)
- (2) integrate the relationship between an organelle's structure and function within different cells
- (3) model how molecules necessary for an organelle's function are routed to the correct organelle
- (4) depict the flow of information within a cell and between cells (especially neural transmission)
- (5) predict outcomes when information flow within a cell or between cells is not correctly regulated
- (6) reconstruct how a cell grows, duplicates, and dies
- (7) create a dynamic model of a cell and its behaviors under different conditions.

A section below provides detailed information on class structure and its relation to your learning and workload.

**Prerequisites:** The Department of Biological Sciences is *strictly enforcing* the prerequisites for Bio2550. The prerequisites for this class are Bio1510 with a C- or better, or transfer of equivalent courses. If you do not meet these criteria, you **must** drop BIO2550. If you wish to discuss this policy contact a Biology departmental advisor, as I cannot alter the outcome. I do know that exceptions are rarely granted.

**Text:** The text is REQUIRED reading, and an important part of your learning. Unless otherwise stated, students are responsible for **ALL** material found in the assigned chapters even if NOT specifically covered in class: this does not mean that you memorize everything. The chosen text is a national standard: **Essential Cell Biology**, Fifth Edition, by B. Alberts, et al., [ISBN-13: 978-0393680362]. You **MUST ALSO** purchase online access to the publisher's Smartwork5 platform as I will use this platform to provide you opportunities to monitor your study through quizzes and tests, while providing additional study tools (e.g. flashcards, videos, animations etc). Smartwork is accessed directly through our Canvas site.

You are also **strongly encouraged** to do the questions/problems interspersed throughout each chapter. They are great for self-evaluation and most importantly allows you to identify what you do NOT know before an exam; variations of these questions also appear on exams.

**Office hours:** As the class is on-line contact me by e-mail ([ad5089@wayne.edu](mailto:ad5089@wayne.edu)) if you need to meet with me and we will set up a Zoom meeting or phone call appointment. A session with a group of you would also be welcome, and only one of you would need to act as the coordinator. If certain topics are particularly difficult, e-mail that information to me and we can discuss them as part of a synchronous Tuesday or Thursday lecture session.

**Class Web Site:** Go to Academia and then to our Canvas web site (or bookmark Canvas site directly). The Canvas site is our major communication portal and probably your most important link. It will have everything you need, including direct access to Zoom meetings, direct access to publisher's Smartwork (which includes quizzes and tests) and access to exams via Canvas. In addition, this is where I post announcements, provide links to lecture video's and a pdf of the slides, as well as the Deep Study Manual.

**Attendance:** Class attendance (remote) is mandatory for those days in which a synchronous exam is being held (see dates below): failure to write the exam results in a grade of zero (0) for that exam (see below about drops and lack of makeup). I **strongly** recommend that you attend all classes as our deep discussion of concepts is an important part of the class structure and your learning. It should in fact be some of your best study time, assuming you come prepared and are willing to speak up.

**Timeliness:** Remember everything occurs by computer and a computer is very good at telling time. Class exams (run through Canvas) will start precisely on time and will end at designated time – so do not log on late, as extra time will not be provided. Likewise, all deadlines for quizzes and tests are “firm” so don't leave it to the last minute and run out of time. You must also pay close attention to the due dates for quizzes and tests (via Smartwork) which will be announced, but will likely fluctuate as they need to coincide with the pace of the class, or holidays. Yet, each quiz or test will have firm end dates and time. While I may allow you to take these quizzes or tests after the due date, you will do so with a stiff penalty (loss of possible points).

**Cheating:** Is not allowed: it is against the Honor Code that each of you has signed. This does not change just because we are online. In fact the onus is now even more on you. **Thus, you are on your Honor to do all on-line quizzes, tests and exam on your own.** Cheating includes all sorts of things although obvious things include as an example, copying/sharing work or answers by any means electronic or otherwise, substituting for someone to take an exam, or submitting work for someone else. Depending on severity/type of cheating your penalty may range from a “zero” for that particular assignment (exam/quiz/test, or discussion activity) without recourse to dropping it, to removal from the class as per university regulations. *I will report ALL infractions (regardless of magnitude) to the Deans office as they are tracking this behavior across classes and can enter information into your permanent record as necessary.* By the way, you are not really cheating the prof - you are cheating each other. As a WSU student, if you are aware of a fellow student cheating you are expected to report it to the prof or TA.

**Class structure leads to deep learning:** You can never be a passive learner, and this is even more so with our on-line environment.

Recall, this class focuses on **learning how and why** a cell works, which is much different (and harder) than only memorizing a bunch of “what” facts mentioned in a textbook. From your perspective, the biggest difference between memorizing and learning material is the amount of active work required by you *on a daily/weekly basis*. As such, I have arranged it such that 60% of your grade will be based on your weekly workload as you complete quizzes, tests and discussion material, each with firm weekly deadlines. The remaining 40% will be class exams offered on-line on dates shown below.

	%	Pts
Chp quizzes	15	75
Chp tests	25	125
Discussion	20	100
top 3 Exams	40	200
(drop lowest of 4)	100	500

Learning begins with active reading of a textbook (which is also a lifetime skill), but this does not mean to memorize everything in it. In fact, you are better off reading it through in a fairly general fashion and study the figures to get the general idea. Lecture recordings also provide a glimpse of how the prof “reads” the textbook. To keep you thinking, several questions are embedded into the lecture recording, and while points show up in Canvas (I had no choice), they do NOT count towards a grade.

A general reading the textbook and/or listening to recorded lectures in a timely fashion is the first step. **It is critical that you do so BEFORE our weekly synchronous lectures and discussion sections.** You need to expose yourself to this material both to follow and to participate in our detailed discussions of the material during our synchronous lectures and discussion sections. But you do not necessarily have to take

**EXAM DATES:**

- 1. Tuesday Sept 29, 2020
- 2. Thursday Oct 22, 2020
- 3. Thursday Nov 19, 2020
- 4. Tuesday Dec. 22, 2020  
(in FINAL exam slot so  
STARTS at 8 am- 9:15 am

copious notes while reading. [And note taking does not mean copying everything written in the textbook.] Instead, use the Deep Study Manual that has been uploaded to guide your note taking and consideration of the material. This manual also serves as an outline for our synchronous lectures and discussion sections, thus demonstrating how one studies the material. Again, it should be clear that the utility of the manual and our synchronous sessions are only as good as your preparation. I am reasonably sure you will get lost if you did not try to read the material first.

This is the main reason you are being assigned quizzes ahead of lectures and why due dates are firm. The chapter tests will be available through publisher site after we discuss things in class and you had a weekend (usually) to go over it all again. And because the workload keeps going, firm deadlines are used to help you stay on track.

**Grading Policy:** A large portion of your grade is based on your ability to keep up with the weekly workload: weekly chapter quizzes make up 15%, and chapter tests another 25% of your grade. Both Quizzes and Tests are administered through publisher's Smartwork site (you purchase access). The number and type of questions will vary but at the end of the semester quizzes will be worth 75 points and test 125 points. Due dates (day and time) will be announced and if or when late submission are allowed, a loss of points (a penalty) will apply. Quizzes and test questions in Smartwork are mostly multiple choice, but, especially on tests, can be higher order thinking, and application.

You will also have four in class EXAMs administered on-line via our Canvas web site. Lockdown browser and web cam will be utilized. The dates of these are shown in the box at left, and will not change Although the chapters covered will likely be that shown in class schedule, these could change based on the pace of the class. Your top three exam scores will count towards 40% of your final grade (200 points). Because you drop your lowest exam, it acts as a makeup exam. No other make up exam will be provided regardless of your reason for missing a class exam. It is STRONGLY recommended that you take all four exams and then drop your lowest. Exams will cover more than one chapter of information and will include application questions; some questions may require short written answers or finishing a diagram or table etc.

TAs are:  
Lisa Koshko  
T - 11:30 am-12:20 pm  
T - 1:30 - 2:20 am  
[eg1512@wayne.edu](mailto:eg1512@wayne.edu)  
Appointments by email.  
Katherine Dwyer  
Th 11:30 - 12:20 am  
Th 1:30 am - 2.20 pm  
[fa3735@wayne.edu](mailto:fa3735@wayne.edu)  
Office hours: M-F by  
email/appointment.

Each of you is enrolled in a **discussion section**, which occurs after the lecture sessions on Tuesday or Thursday. These are synchronous sessions run by Graduate Teaching Assistants (see box). These are mandatory and work done in these sessions will account for a portion (~20%) of your final grade. It is hoped that these smaller sessions (~20 students) will allow you to fully participate in a variety of exercises designed to deepen your learning. Unfortunately, they must be held remotely, but they will be synchronous with posted section times.

93-100%	A
90-92	A-
86-89	B+
83-85	B
80-82	B-
76-79	C+
73-75	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
59 or less	F

**Final grade calculation:** At the end of the year, a letter grade is calculated based on total points accumulated as delineated above. Total points will be normalized to the second highest total points obtained in the class, and this number is then converted into a percentage. Finally, this percentage is rounded (the usual way) to the nearest whole number and converted to a letter grade using the table shown at left. There is always someone on the border, but I do NOT just give you a point to improve a grade: instead you have an opportunity to earn up to 500 points during the semester.

**Individuals with Disabilities:** If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is available on-line [<https://studentdisability.wayne.edu/>] and is prepared to help meet your needs and set up accommodations. Once you have your accommodation in place, send me an email and we will discuss your needs in privately.

**Religious Conflicts:** If you have a conflict with any of the scheduled class or exam times due to religious reasons, you must notify me in writing by class time on **Sept 5, 2019**: look over ALL exam dates now. Every attempt will be made to find a mutually convenient solution, but at times, this may include using your ability to drop one exam. No make-up exams will be given unless you have notified me in writing by the above date. Contact your lab TA directly for conflicts with lab assignments.

**ADD/DROP POLICY:** I follow all university policies on adding or dropping class and I recommend that you contact Mrs. Hunter, Biology Advisor for help in this regard. Note Wayne State has changed the grading policy, and in particular there are no more "X" grades; you will receive an F if you fail to do the administration work required to drop the class. Per WSU regulations, if you drop the course, you will be assigned WP, WF or WN as appropriate. Any "I" given to a student will automatically revert to "F" if the work is not completed within one calendar year. There are no exceptions. For details see: <http://sdcl.wayne.edu/RegistrarWeb/Registrar/policies.htm>.

#### **UNEXPECTED UNIVERSITY CLOSURES.**

If the University is officially closed on an exam day, the exam will be held on the next regularly scheduled class day. Closure of the University is announced by the following mechanisms:

1. University News line (313) 577-5345 \*
2. WSU Homepage ([www.wayne.edu](http://www.wayne.edu)) \*
3. WSU Pipeline ([www.pipeline.wayne.edu](http://www.pipeline.wayne.edu)) \*
4. WSU broadcast text and e-mail. \*
5. WDET-FM (Public Radio 101.9)
6. Other local radio and television stations

\* Note: The information on closures and class cancellations is likely to be found at these locations before it is broadcast by local radio and television stations

Any specific issue not covered by this syllabus will be resolved using University policies.

Disputes that cannot be resolved following the guidelines present in this syllabus will be resolved by following the guidelines of the University "Student Due Process".

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## VanBerkum

### Tentative Class Lecture Schedule

W20

		TENATIVE SCHEDULE		
		Exact dates and times for quizzes and tests to be announced		
		Lecture: Deep Learning Guide	Smartwork	Smartwork
		Chp pre-Quiz	Chp Test	Discussion
Sept.	1	admin, Chp 4	Chp 2	admin -bonds
	3	Chp 4: Proteins	chp 4	admin -bonds
	8	chp 4: Proteins	Chp 11	chp 4
	10	Chp 11: Membranes		Chp 4
			Chp 12A	
	15	Chp 12: Membrane Transport		Chp 11/12
	17	Chp 12: Resting Membrane Pot		Chp 11/12
		<i>Chp 12A = focus on Transport and Vm; Chp 12B = focus on AP and communication</i>		
	22	Chp 12: AP initiate & propagate	Chp 12B	Chp 12
	24	Chp 12: Neuronal Signaling		Chp 12
	29	<b>EXAM 1 - chp 4, 11 &amp; 12</b>	Chp 13	Chp 13
Oct	1	Chp 13: Energy		Chp 13
			Chp 14	Chp 13
	6	Chp 14: Energy & Mitochondria		Chp 14
	8	Chp 14: Energy & Mitochondria		Chp 14
			Chp 15	Chp 14
	13	Chp 15; Intracellular Compartments		Chp 15
	15	Chp 15; Intracellular Compartments		Chp 15
			Chp 5	Chp 15
	20	Chp 5: DNA & begin Chp 6		Chp 5/6
	22	<b>EXAM 2 - Chp 13-15</b>		Chp 5/6
			Chp 6	
	27	Chp 6: Replication and repair		Chp 6
	29	Chp 7A: Transcription	Chp 7A	Chp 6
		<i>Chp 7A - txn &amp; splicing; Chp7B translation</i>		
Nov.	3	Holiday - election		
	5	Chp 7: Trxn & Splicing	Chp 7B	Chp 7
			Chp 7A	
	10	Chp 7B: Translation	Chp 8	Chp 7/8
	12	Chp 8: Gene Regulation		Chp 7/8
			Chp 16	Chp 7B/8
	17	Chp 16 Cell Signaling		Chp 16
	19	<b>EXAM 3 - Chp 5-8</b>		Chp 16
	24	Chp 16 Cell Signaling (start 17?)		
	26	THANKSGIVING		Chp 16
			Chp 17	
Dec	1	Chp 17: Cytoskeleton		Chp 17
	3	Chp 17: Cytoskeleton		Chp 17
			Chp 18	Chp 17
	8	Chp 18: Cell cycle/division		Chp 18
	10	Chp 18: Cell cycle/division		Chp 18
			Chp 18	
Dec	22	<b>EXAM 4: Chp 16, 17, 18</b>		
		<b>"Final Exam Slot" 8-10 am</b>		
		<b>may reduce time allotted</b>		

Recall, lectures will be interactive discussion sessions via Zoom. Uploaded dep study guide material will guide that conversation.

The exact dates and times that Smartwork quizzes and tests will be available will be announced on Canvas. But in general, as quizzes are designed to make you read a chapter BEFORE a lecture, these will be activated by the Monday before we start lectures on chapter that Tuesday. Occasionally this may occur the Wednesday before a Thursday lecture.

Conversely, Chapter tests will occur after we complete the chapter and had a weekend to study it. These will generally be available for only a day or may have few (to no) extra attempts.

Sometimes you will have access to quizzes or test after published due dates, but in these cases you will incur a point penalty.

**Exams** (highlight yellow) will occur via Canvas and will be administered synchronously to all students during indicated class lecture period (Tuesday or Thursday between 10-11:15 am). Length of time allowed will depend on actual exam content. Fourth exam will occur during the scheduled final exam period. While 2 hours is allotted, it will be shorter, mimicking the other class exams.