








**Advanced Human Physiology (Biol 4600)**  
**Schedule of Classes, Spring 2020**

<u>WEEK</u>	<u>DAY</u>	<u>SUBJECT</u>	<u>READING IN BOOKLET</u>	<u>CORRESPONDING READING IN TEXT</u>
1	Mon, Jan 6	Brief Introduction and Interactions Between the Cells and the Extracellular Environment, Part #1	3-14	130-142
	Tues, Jan 7	Interactions Between Cells and the Extracellular Environment, Part #1	3-14	130-142
	Wed, Jan 8	Interactions Between Cells and the Extracellular Environment, Part #2	15-24	142-149
	Fri, Jan 10	Interactions Between Cells and the Extracellular Environment, Part #3 Optional Review Session at 4:30 pm in room to be announced later	25-30 -----	149-161 -----
	Mon-Fri	“Reproduction Revealed #1” at Canvas Site	454-457	702-705
	Tues-Thur	<b>Lab #1:</b> DVD (no lab points, but questions in upcoming lab quiz and final exam)	2	-----
2	Mon, Jan 13	The Nervous System, Part #1	31-39	162-171
	Tues, Jan 14	The Nervous System, Part #2	40-58	172-184
	Wed, Jan 15	The Nervous System, Part #2	40-58	172-184
	Fri, Jan 17	The Nervous System, Part #3 Optional Review Session at 4:30 pm in room to be announced later	59-73 -----	184-205 -----
	Mon-Fri	“Reproduction Revealed #2” at Canvas Site	458-466	705-710
	Tues-Thur	<b>Lab #2:</b> WBC Differential Counts and Leukemia (10 points possible)	3-15	-----
3	Mon, Jan 20	<b>HOLIDAY</b> 	-----	-----
	Tues, Jan 21	The Nervous System, Part #3	59-73	184-205
	Wed, Jan 22	The Central Nervous System, Part #1	74-90	206-225
	Fri, Jan 24	The Central Nervous System, Part #1 Optional Review Session at 4:30 pm in room to be announced later	74-90 -----	206-225 -----
	Mon-Fri	“Reproduction Revealed #3” at Canvas site	467-469	710-712
	Tues-Thur	<b>Lab #3:</b> Osmosis and Diffusion (10 points possible)	16-21	-----
4	Mon, Jan 27	<b>EXAM #1</b> <b>(Last Day to Drop Without Notation on Transcript)</b>	-----	-----
	Tues, Jan 28	The Central Nervous System, Part #2	91-105	225-242



	Wed, Jan 29	The Central Nervous System, Part #2	91-105	225-242
	Fri, Jan 31	The Autonomic Nervous System Optional Review Session at 4:30 pm in room to be announced later	106-119 -----	243-265 -----
	Mon-Fri	“Reproduction Revealed #4” at Canvas site	470-473	712-716
	Tues-Thur	<b>Lab #4:</b> Reflex Functions (10 points possible)	22-32	-----
5	Mon, Feb 3	The Autonomic Nervous System	106-119	243-265
	Tues, Feb 4	Endocrine Glands, Part #1	120-144	316-341
	Wed, Feb 5	Endocrine Glands, Part #1	120-144	316-341
	Fri, Feb 7	Endocrine Glands, Part #2 Optional Review Session at 4:30 pm in room to be announced later	145-156 -----	341-358 -----
	Mon-Fri	“Reproduction Revealed #5” at Canvas site	474-477	716-719
	Tues-Thur	<b>Lab #5:</b> Evaluation of Sensory Structures (10 points possible)	33-49	-----
6	Mon, Feb 10	Endocrine Glands, Part #2	145-156	341-358
	Tues, Feb 11	Muscle, Part #1	157-173	359-377
	Wed, Feb 12	Muscle, Part #1	157-173	359-377
	Fri, Feb 14	Muscle, Part #2 Optional Review Session at 4:30 pm in room to be announced later	174-190 -----	377-403 -----
	Mon-Fri	“Reproduction Revealed #6” at Canvas site	478-480	719-722
	Tues-Thur	<b>LAB QUIZ # 1 and DVD</b> (5 points possible for attendance)	-----	-----
7	Mon, Feb 17	<b>HOLIDAY</b>	-----	-----
	Tues, Feb 18	Muscles, Part #2	174-190	377-403
	Wed, Feb 19	Blood	191-209	404-414
	Fri, Feb 21	Blood Optional Review Session at 4:30 pm in room to be announced later	191-209 -----	404-414 -----
	Mon-Fri	“Reproduction Revealed #7” at Canvas site	481-483	722-725
	Tues-Thur	<b>Lab #6:</b> Muscles (10 points possible)	50-57	-----
8	Mon, Feb 24	<b>EXAM #2</b>	-----	-----
	Tues, Feb 25	Coagulation	210-224	414-418
	Wed, Feb 26	Coagulation	210-224	414-418
	Fri, Feb 28	Heart Optional Review Session at 4:30 PM in room to be announced later	225-246 -----	418-431 -----
	Mon-Fri	“Reproduction Revealed #8” at Canvas site	484-492	725-730
	Tues-Thur	<b>Lab #7:</b> Dissection of Sheep’s Brains	58-72	-----

		and Examination of Previously Exposed Human Brains (10 points possible)		
9	Mon, Mar 2	<b>SPRING BREAK</b>		-----
	Tues, Mar 3	<b>SPRING BREAK</b>		-----
	Wed, Mar 4	<b>SPRING BREAK</b>		-----
	Fri, Mar 6	<b>SPRING BREAK</b>		-----
	Tues-Thur	<b>SPRING BREAK (No Labs)</b>		-----
10	Mon, Mar 9	Heart		225-246
	Tues, Mar 10	Blood Vessels, Atherosclerosis, Cardiac Arrhythmias, and Lymphatic System		247-264
	Wed, Mar 11	Blood Vessels, Atherosclerosis, Cardiac Arrhythmias, and Lymphatic System		247-264
	Fri, Mar 13	Cardiac Output, Blood Flow, and Blood Pressure, Part #1 Optional Review Session at 4:30 PM in room to be announced later		267-283 -----
	Mon-Fri	“Reproduction Revealed #9” at Canvas site		493-498
	Tues-Thur	<b>Lab #8:</b> Blood Pressure, Heart Rate, Electrocardiography, and Heart Sounds (10 points possible)		73-91
11	Mon, Mar 16	Cardiac Output, Blood Flow, and Blood Pressure, Part #1		267-283
	Tues, Mar 17	Cardiac Output, Blood Flow, and Blood Pressure, Part #2		284-307
	Wed, Mar 18	Cardiac Output, Blood Flow, and Blood Pressure, Part #2 <b>Last day to drop with a “W” on transcript</b>		284-307
	Fri, Mar 20	The Immune System, Part #1 Optional Review Session at 4:30 pm in room to be announced later		308-332 -----
	Mon-Fri	“Reproduction Revealed #10” at Canvas site		499-501
	Tues-Thur	<b>Lab #9:</b> Blood Coagulation Testing (10 points possible)		92-108
12	Mon, Mar 23	The Immune System, Part #1		308-332
	Tues, Mar 24	The Immune System, Part #2		333-350
	Wed, Mar 25	The Immune System, Part #2		333-350
	Fri, Mar 27	Respiratory Physiology, Part #1 Optional Review Session at 4:30 pm in room to be announced later		351-369 -----
	Mon-Fri	“Reproduction Revealed #11” at		502-507
				734-737

		Canvas site		
	Tues-Thur	<b>LAB QUIZ #2 and DVD</b> (5 points possible for attendance)	-----	-----
13	Mon, Mar 30	<b>EXAM #3</b>	-----	-----
	Tues, Mar 31	Respiratory Physiology, Part #1	351-369	532-546
	Wed, Apr 1	Respiratory Physiology, Part #2	370-378	547-559
	Fri, Apr 3	Respiratory Physiology, Part #2 Optional Review Session at 4:30 pm in room to be announced later	370-378 -----	547-559 -----
	Mon-Fri	“Reproduction Revealed #12” at Canvas site	508-513	737-742
	Tues-Thur	<b>Lab #10:</b> Glucose Tolerance Test, Urinalysis, and Kidney Dissection (10 points possible)	109-122	-----
14	Mon, Apr 6	Respiratory Physiology, Part #3	379-393	559-598
	Tues, Apr 7	Respiratory Physiology, Part #3	379-393	559-598
	Wed, Apr 8	Respiratory Physiology, Part #3	379-393	559-598
	Fri, Apr 10	Optional Review Session at 4:30 PM in room to be announced later	-----	559-598 -----
	Mon-Fri	“Reproduction Revealed #13” at Canvas site	514-516	743-745
	Tues-Thur	<b>Lab #11:</b> Semen Analysis and Examination of Testes (and evaluations of TAs and UAs) (10 points possible). <b>Confirm your points earned to-date in lab with your TA during this lab!</b> (The TA will make a note that this meeting occurred so there are NO disagreements later about your lab points!)	123-147	-----
15	Mon, Apr 13	Physiology of the Kidneys, Part #1	394-411	581-598
	Tues, Apr 14	Physiology of the Kidneys, Part #1	394-411	581-598
	Wed, Apr 15	Physiology of the Kidneys, Part #2	412-424	598-618
	Fri, Apr 17	Physiology of the Kidneys, Part #2 Optional Review Session at 4:30 pm in room to be announced later	412-424 -----	598-618
	Mon-Fri	“Reproduction Revealed #14” at Canvas site	517-520	-----
	Tues-Thur	<b>Lab #12:</b> DVD and Discussion on Natural Childbirth (5 points possible for attendance)	148-149	-----
16	Mon, Apr 20	The Digestive System, Part #1	425-440	619-636
	Tues, Apr 21	The Digestive System, Part #1	425-440	619-636
	Wed, Apr 22	<b>Interim Day (No classes)</b>	-----	-----
	Mon-Friday	“Reproduction Revealed #15” at	521-525	746-753



		Canvas site		
	Tues-Thur	<b>NO LABS THIS WEEK!</b>	----	----
17	Wed, April 29	<b>Comprehensive Final Exam 3:30-5:20 PM</b>	----	----



**Advanced Human Physiology (Biol 4600)**  
**(5 credits)**  
**Spring 2020**

- A. Instructor:** **Dr. Andy Anderson** (Please call me Andy!)  
 Address: Biology Department  
 VSB 231  
 Utah State University  
 Logan, UT 84322-5305  
 Phone: 797-1913 (If I'm not in, leave a message on my voice mail.)  
 E-mail: [andy.anderson@usu.edu](mailto:andy.anderson@usu.edu) (messages sent to this personal email arrive much quicker than messages sent to me via Canvas, so use this personal email)

**B. Teaching Assistants (TAs) and Undergraduate Aides (UAs):**

- There are TAs and several volunteer Undergraduate Aides assigned to this course. Their names and office hours will be provided during the first days of class.
- Historically, students who utilize the TA and UAs faithfully earn higher grades!

**C. Meeting Times:**

- Lecture** (index #10385) – This five-credit class meets on Mondays, Tuesdays, Wednesdays, and Fridays for 50 minutes of lecture from 3:30-4:20 PM in WIDT 007. There is an optional review session every Friday at 4:30 PM in a room to be announced.
- Laboratory** – There are four laboratory offerings which meet in **LSB 208**. Students are **required** to sign up for one laboratory section per week. Please go to the laboratory you regularly attend! **Don't move around because the TAs need to keep track of your points earned in lab!**

Index #	Section	Day	Time
10386	501	Tuesday	10:30 am - 12:20 pm
10387	502	Tuesday	1:30 pm – 3:20 pm
26274	504	Thursday	10:30 am – 12:20 PM
12033	503	Thursday	1:30 pm – 3:20 pm

**D. Required Materials for Biol 4600:**

1. Stuart Ira Fox's book "*Human Physiology*", 15<sup>th</sup> edition. This text is available at the USU Bookstore in a loose-leaf, three-holed packet (it was the only way the publisher would sell it to us!)
  - a. This text has a nice glossary at the back of the book on pages G1-G19.
  - b. If you are interested in using the "Connect" features (which are optional for this class), the Connect URL for our text is  
**[http://connect.mheducation.com/class/a-anderson-smartstart-course 1](http://connect.mheducation.com/class/a-anderson-smartstart-course-1)**
2. Course booklets (3 volumes) which contains all needed lecture notes, supplemental articles, and laboratories. These booklets are available at the USU Bookstore.

**E. Optional Materials for Biol 4600:**

1. It is recommended (but not required) that students have one other physiology text available for study. An extra text will often serve to clarify points which are confusing, or reinforce those which are considered important.
2. I *used* to suggest that students purchase a medical dictionary, but now most students can just look words up on their smart phone.

**F. Course Booklets:**

1. For each lecture in this course (and for the "Reproduction Revealed" presentations at the Canvas site) the student is provided with an outline of the subjects to be discussed that day. These outlines are designed to guide your participation during the lectures and also to guide you in your reading of the textbook. These outlines typically have articles attached on which you will be tested. All of these outlines and articles have been collected into course booklets for your use.
2. If there is information in your textbook that is not mentioned in class, or not mentioned in the course booklets, it will not be on the exam.
  - a. You are encouraged to read supplemental information in your text, but you will only be tested from the text on what is referred to in the course booklet or in our class discussions.
  - b. Note that the booklets often requires you to read articles in the text [i.e.: *Read the "Clinical Application on page 132]* for use on your tests!

**G. Lecture Recordings and Images**

1. The audio recording of the lectures and review sessions, and the images used, will be available on the Internet shortly after the lectures and reviews are over. You can access them by going to the CANVAS site for this course. The lectures and images from the last time this course was taught (spring 2019) will be there as well.
2. **"Reproduction Revealed" at the Canvas site.**
  - a. There are 15 required "Reproduction Revealed" presentations at the Canvas site.
  - b. You are required to listen to one of these short presentations every week of the semester (except for Spring Break). **Do it every week!**

- c. The notes for these “Reproduction Revealed” presentations are in your booklet of lecture notes.
- d. Questions from these “Reproduction Revealed” presentations, the notes, and the supplemental readings for each will appear on your regular exams **and** on your Final Exam.
- e. You must listen to one of these “Reproduction Revealed” presentations every week, and read the designated supplemental readings, to be prepared for your exams!

## H. Examinations, Quizzes, and Lab Points for Biol 4600

1. There will be three 50-minute exams of 100 points each (ALL of them count) and a 110-minute comprehensive final exam (over everything except articles used in earlier exams) worth 200 points. The lecture notes, **class discussions**, handouts, laboratories, and occasional articles distributed in class will be used to formulate exam questions.
2. Your scored and stapled-closed answer sheets will be posted **on the wall outside of VSB 219** on the Monday morning of the next week following your exam.
  - a. I will pass out permission slips in the first days of class for you to agree, or not agree, to me posting your stapled-closed answer sheet on the wall outside of VSB 219.
3. **There will be two lab quizzes (50 points each) presented in the laboratory that will be prepared and administered by the TAs.**
4. Students’ grades will be calculated using ALL three of the 50-minute exams (they ALL count and you can’t drop one!), the lab quizzes, the lab points (for pre-lab quizzes and attendance), and the final.
5. An example first exam is included at the back of this syllabus. While the questions will be different this year, the style will be exactly the same (multiple-choice, fill-in-the-blank, two-part story questions, and one essay question).
6. Those students who have difficulty with the example first exam and example question in the book should see the instructor as soon as possible to arrange free tutoring with the TAs, SI, and UAs.
7. Those students who (“heaven forbid!”) score less than 70% on the first two exams **should seriously seek intensive tutoring or drop the class.**
8. As indicated on the course schedule, there are points that are earned for every laboratory this semester (total of 115 possible). These will be recorded by your lab TA.
  - a. Students have the ability to earn 5 points for a pre-lab quiz at the start of each of the 10 **active** labs (Lab #1 you just watch a video) and an additional 5 points for attendance.
    - 1) For those **passive** labs when you only watch a video (Lab #1 or those following the lab quizzes) or when you listen to my wife, there is no pre-lab quiz and you will only earn the 5 points for attendance.
  - b. The pre-lab quiz will be 5 questions over the lab that is to be done that day and it will start at 3 minutes after the schedule lab starting time! It will only last for about 5 minutes.

- c. This pre-lab quiz accomplishes two things: it insures you are to your lab on time and it makes the TAs and UAs happy because you have looked over the lab before arriving and ready to answer the pre-lab questions.
    - 1) If a student arrives in the lab too late to take the pre-lab quiz, they will NOT be allowed to take the pre-lab quiz. Remember one of the purposes for this pre-lab quiz is to have student arrive on-time!
  - d. **Each TA** in each of the respective labs will create 5 straightforward questions for the students to answer, print up this pre-lab quiz before lab, score it, and keep a record of points earned (5 points per pre-lab quiz) to be turned into to me at the end of the semester.
    - 1) The scored pre-lab quizzes can be returned to the students at the next lab.
  - e. **Each UA** will take attendance (worth 5 points) at some point in the lab (usually after one hour) and give that list to the **TA** for recording.
  - f. So, the **TA** will be keeping a permanent record of the points earned from the pre-lab quiz and from attendance (with the help of the UA).
9. The letter grade is based on the percentage of total points earned on the three 50-minute exams (100 points each), the two lab quizzes (50 points each), the 110-minute final (200 points), and points earned in the laboratory for pre-lab quizzes and attendance (115 points). **THERE IN NO EXTRA CREDIT OR SPECIAL PROJECTS TO IMPROVE YOUR GRADE.** The breakdown is as follows:

Actual Points Earned	Percentage of Total Points Earned	Grade
661-715	93-100	A
640-660	90-92	A-
611-639	86-89	B+
590-610	83-85	B
568-589	80-82	B-
540-567	76-79	C+
518-539	73-75	C
497-517	70-72	C-
468-496	66-69	D+
425-467	60-65	D
424 or less	59 or less	F

- 10. Up through the last office hour you are invited to see me or the TAs to view the exam keys and debate your scores. **After the last office hour, I will only discuss the final exam with you, not your scores on earlier tests or quizzes.**
- 11. You **MUST** confirm your points earned in lab with your TA as indicated on the schedule two weeks before the end of classes.

### I. Course Goals:

The main goal of this course is to give students a **detailed** understanding and working knowledge of the functioning of their own bodies. Numerous medical examples will be provided to illustrate the importance of the systems presented. The *Clinical Applications*



and other medical citations from the text will be specifically reviewed at the regular Friday review sessions.

It is expected that upon successful completion of this course students will be able to effectively apply the knowledge gained in more advanced courses, in their careers, and in their daily lives.

**J. Student's Responsibilities:**

The student is expected to attend all lectures and laboratories, take supplemental notes, read the assigned readings, refer to suggested references as needed and achieve a cumulative score of greater than 75% on the exams. To prepare for the exams students should study about 2 hours per day outside of class (make charts or lists, write practice questions, analyze articles, etc.)

In the event there is some difficulty, it is the **student's responsibility** to contact the instructor, SI, UAs, or TA for advice or assistance. Free tutoring is available with the TA and UAs.

**K. Instructor's Responsibilities:**

The instructor is expected to attend all lectures, read the assigned reading, present supplemental articles, and prepare examinations which are fair and representative of the material covered. The instructor will also be available at posted office hours to answer **specific** student questions and provide needed assistance.

**L. Teaching Assistants and Undergraduate Aides' Responsibilities:**

There are several TAs and several UAs assigned to this course each semester. The TAs and UAs will come to the lectures as needed so that they will be qualified tutors for each of your exams. Some of the UAs will attend the review sessions each week where the *Clinical Applications* and other medical examples from the text will be reviewed and students are quizzed by the UAs with questions the UAs have prepared. The TAs and UAs will assist the instructor in writing the lecture exams. The TAs will correct and score the exams promptly after they are taken by the students. The TAs and UAs will have published office hours to provide help to interested students. **(If the TAs or UAs fail to show up at his/her office hour, please let me know!).**

The TAs and UAs are also expected to attend their individual laboratories, prepare pre-lab quizzes, take attendance, have all the necessary materials available, and be knowledgeable about the scheduled lab exercises. The TAs and UAs will write and administer two lab quizzes. After correcting these quizzes, they will turn them in to Andy for grade recording and posting.

**M. Library References:**

1. A copy of the course textbook, "*Human Physiology, 15<sup>th</sup> edition*" is on reserve at the Media Collections Department in the Library.
2. Check the subject index in the Library to find additional useful books on physiology and anatomy.

**N. Below you will find a University statement on Academic Honesty.**

- 1. DO NOT REMOVE ANY EXAMINATION MATERIALS FROM THE CLASSROOM OR LABORATORY ON EXAM DAYS!**
- 2. DO NOT COPY OR REMOVE ANY EXAMINATION MATERIAL FROM THE TEACHING ASSISTANTS' OFFICES!**
3. If you fail to follow these rules, I will make every effort to subject the offender to the disciplinary procedures designated by the University.

**Honor Pledge**

Students will be held accountable to the Honor Pledge which they have agreed to: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

**Academic Dishonesty**

The Instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code:

Acts of academic dishonesty include but are not limited to:

1. Cheating: (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually"; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.
2. Falsification: altering or fabricating any information or citation in an academic exercise or activity.
3. Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Full text of the Student Code available at available at available at <http://www.usu.edu/student-services/pdf/StudentCode.pdf>:

**O. Students with Disabilities**

Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, 797-2444, 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in

the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

**P. Unacceptable Classroom Behavior**

Since a significant goal of this class is to prepare each of you for your upcoming exams, then behavior that disrupts the classroom environment will be discouraged.

1. Once class has started, **cell phones should be silenced** and no ring tones or conversations are permitted.
2. Once class has started, **talking and whispering among students is strongly discouraged**. If you need to talk, please leave the class and conduct your conversation outside. If students persist in talking among themselves during class, they will be asked to leave the room so other students can benefit from the limited amount of class time available.
3. Use of laptop computers in class is acceptable, provided it is utilized for notes or materials used in this class. **It is not acceptable to use your computer in class for recreational purposes or for doing work for a different class**. When you come to this class it is expected that you will focus your attention on this class and not engage in computer activities that detract from the classroom experience or that will distract your classmates. If the problem persists, you will be requested to cease your computer activities.

**Q. University policy on withdrawals and incomplete grades.**

1. I direct your attention to the current USU policy on incompletes and withdrawing from courses in the on-line Catalog, under Registration.
  - a. You will note that “incomplete grades” are only given for conditions beyond the students’ control and not due to poor performance. A student who receives an incomplete must retain all the scores they earned up to the date of the incomplete and later will **ONLY** be allowed to finish the remaining quizzes or exams.

**S. Notice on lab fees (\$80)**

1. As part of your registration for this class you were required to pay a “lab fee” of \$80. This fee is used by me to buy lab supplies and obtain specimens. All of your lab fees are used to enhance your learning opportunities in this course and to help your TA, UAs, and your instructor, to hopefully make it easier for you to succeed in this challenging subject.

**T. Laboratory Safety (New Rules!)**

1. The entire university has adopted a **NEW** safety protocol for all student laboratories. The **minimum** required protection to enter a laboratory is:
  - a. Fully closed shoes
  - d.  $\frac{3}{4}$  length laboratory coat that is fastened shut (These will be provided in the laboratory).
  - e. Eye goggles/glasses (these will be provided in the laboratory).
  - f. Nitrile gloves when working with chemicals or human/animal products.
2. If you do not have this minimum required protection, you will **NOT** be allowed to enter (no exceptions for **ANY** time you enter the lab!).

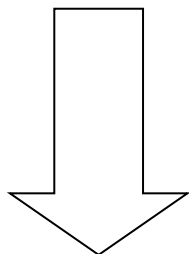
- a. I realize that for some labs you merely have a quiz or watch a video. However, the University policy is for entering a lab, regardless if the lab is active or not because of the hazardous chemicals in the lab!
- b. If you are just watching a video, you can skip the goggles/glasses and gloves.
3. **When working with chemicals, animal products, or urine, you must also wear the nitrile gloves provided.**
5. There are lockers in the hallway for you to store your backpack and other personal items not needed for the lab.

## General Information for Interested Students Biol 4600

Some students may be interested in taking further courses with me. This sheet will provide that information.

### A. Courses Taught by D. Andy Anderson

1. Fall Semester 2020
  - a. Elementary Microbiology (Biol 2060) 4 credits
  - b. Human Dissection (Biol 4000) 1 credit
32. Spring Semester 2021
  - a. Human Anatomy (Biol 2320) 4 credits
  - b. Bioethics (Biol 3100) 3 credits
  - c. Advanced Human Physiology (Biol 4600) 5 credits
4. Others
  - a. Independent Study (Biol 3760) 1-2 credits – available every semester
    - 1) Students earn credit by writing a term-paper (or more than one) on a mutually agreed topic
  - b. Teaching Internship (Biol 4710) 1 credit – available every semester
    - 1) This credit is available to students who wish to volunteer as an undergraduate aide in a class they have previously excelled in. (Grade of “B” or better)
  - c. I oversee a Medical College Admissions Test (MCAT) review course (Biol 1030, ST: MCAT, one credit, pass/fail). This is offered in the spring and is taught by two Undergraduate Teaching Fellows.
  - d. I oversee a Dental Admissions Test (DAT) review course (Biol 1040, ST: DAT, one credit, pass/fail). This is offered in spring and is taught by two Undergraduate Teaching Fellows.



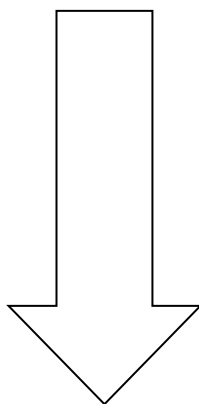
**Student Performance  
On Exams and Quizzes in Biol 4600  
During the Previous Eight Years**

**Average Quiz Scores (50 pts)**

**Average Exam Scores (100 pts)**

<b>Year</b>	<b>Semester</b>	<b>#1</b>	<b>#2</b>		<b>#1</b>	<b>#2</b>	<b>#3</b>	<b>#4</b>	<b>Final</b>
2019	Spring	43.5	45.6		78.8	74.6	66.0	----*	71.2
2018	Spring	37.2	44.9		71.8	68.0	70.0	68.5	77.5
2017	Spring	39.9	43.7		75.0	71.9	80.0	68.5	75.3
2016	Spring	38.0	43.2		76.1	76.1	72.1	74.9	72.5
2015	Spring	42.7	44.9		78.7	73.9	76.0	75.0	78.7
2014	Spring	41.4	43.7		78.4	77.5	74.1	75.5	72.4
2013	Spring	40.4	43.4		75.4	79.1	76.1	75.2	75.4
2012	Spring	45.3	40.7		75.8	79.0	81.8	69.3	74.5
<b>Average</b>		41.1	43.8		76.3	75.0	74.5	72.4	74.7

\*Starting in spring 2019, there will only be three 50-minute midterm exams because the semester was shortened by the University.



## Student Final Grades in Previous Eight Years Of Biol 4600

Semester	Year	Position	Points	Grade
Spring	2019	High	689*	A
Spring	2019	Low	319	F
Spring	2019	Average	565.8	C+
Spring	2018	High	687*	A
Spring	2018	Low	276.5	F
Spring	2018	Average	513.8	C+
Spring	2017	High	676*	A
Spring	2017	Low	411.5	F
Spring	2017	Average	589.2	B-
Spring	2016	High	681*	A
Spring	2016	Low	407.5	F
Spring	2016	Average	577	B-
Spring	2015	High	704*	A
Spring	2015	Low	444	D
Spring	2015	Average	560.5	C+
Spring	2014	High	582	A
Spring	2014	Low	268	F
Spring	2014	Average	475.7	C+
Spring	2013	High	566.5	A
Spring	2013	Low	311	F
Spring	2013	Average	478.1	B-
Spring	2012	High	578	A
Spring	2012	Low	242.5	F
Spring	2012	Average	476.4	C+

\* Starting in 2015 students could now earn 115 points for pre-lab quizzes and

**EXAM #1**  
**Biol 4600, Spring 2018**  
**(Version A)**

- A. YOU MAY WRITE ON THIS EXAM IF YOU DESIRE, BUT MAKE SURE YOU WRITE ALL YOUR ANSWERS ON THE ACCOMPANYING ANSWER SHEETS OF MATCHING COLOR ONLY!!**
- B.** This exam has 47 questions and is worth 100 points. The TAs, UAs, SI, and I hope you all score **over** the previous class average from last spring. Good luck!
- C. FOLLOW THESE INSTRUCTIONS.**
1. Use **only** a No. 2 pencil!
  2. Make sure your Exam, Scan-Tron sheet, and Fill-in-the-Blank answer sheet **ALL HAVE THE SAME IDENTIFYING NUMBER IN UPPER RIGHT CORNER!!**
    - a. WRITE THE STAMPED NUMBER **AND** COLOR OF YOUR EXAM IN THE UPPER MARGIN OF YOUR SCAN-TRON SHEET!
  3. Write your **name** and **email** on the top of Fill-in-the-Blank answer sheet in the space provided.
  4. Write your **name and A number** (letter "A" followed by 8 digits) on the front of the Scan-Tron Sheet.
    - a. Fill in the appropriate corresponding dots
  5. Begin with question #1 and indicate your answers on the Scan-Tron sheet.
    - a. Questions #1 - #32 have only **one** correct response.
      1. Questions #27 - #32 are based upon projection slides that will be shown during the exam.
  6. Questions #33 - #46 are Fill-in-the-Blank.
    - a. Write your response in the spaces provided on the accompanying answer sheet.
  7. Question #47 is an essay question worth 8 points.
    - a. Write your response in the space provided on the accompanying answer sheet.
  8. **YOU MUST TURN IN THE EXAM, THE SCAN-TRON SHEET, AND THE FILL-IN-THE-BLANK ANSWER SHEET TO THE TA AS YOU LEAVE THIS ROOM!**

**D. 1-16 - MULTIPLE CHOICE.** Fill in the space on the Scan-Tron Sheet which corresponds with the single best response (2 points each).

1. A *Clinical Application* in your text discussed and explained that diabetics with hyperglycemia develop glycosuria. Why does this glycosuria happen?
  - A. Failure of facilitated diffusion in intestinal wall
  - B. Transport maximum reached in renal tubule carrier proteins
  - C. Ion channels are blocked
  - D. Lack of posterior pituitary hormone
  - E. Hyperkalemia in blood
  
2. Acute gastroenteritis causes about 4 million deaths every year worldwide, with many of these deaths occurring in underdeveloped nations. Which of the following processes has been shown to dramatically reduce the number of such deaths in underdeveloped countries?
  - A. Cotransport of sodium and glucose
  - B. Providing juice and canned soda to the patients
  - C. Giving them IV mannitol solutions
  - D. Inducing a protective metabolic acidosis through the use of proton donors
  - E. Frequent administration of diuretics
  
3. According to an assigned article, *The Brain*, scientists are trying to get beneficial materials across the blood-brain barrier. Which of the following has been shown to be effective in moving materials across the blood-brain barrier in experimental animal trials?
  - A. Drilling microscopic channels with microwaves
  - B. Adding antibodies to an iron transporter
  - C. Creating highly active hypotonic compounds to lyse select ependymal cells
  - D. By inserting tiny glass probes through the meninges
  - E. All of the above
  
4. A young man went to a rave party and ingested both alcohol and an illegal drug called liquid ecstasy or cherry meth. Unfortunately, both the alcohol and the illegal drug compete for the same liver enzymes for their breakdown and the illegal drug reached high enough levels to induce unconsciousness, just like a Mike Tyson uppercut! Which of the following best describes the illegal drug known as liquid ecstasy or cherry meth?
  - A. Causes IPSPs
  - B. Promotes opening of sodium channels in postsynaptic cells
  - C. Directly causes release of Ach by axon terminals
  - D. Blocks MAO
  - E. Prevents neurotransmitter reuptake by presynaptic cell



5. Which of the following best describes the movement of glucose from the blood into the metabolically active cells of the body?
- A. Active transport
  - B. Facilitated diffusion
  - C. Unaided movement down its concentration gradient by Brownian motion through the nonpolar core of the phospholipid core of the membrane
  - D. Moved by pumps
  - E. All of the above
6. What can cause a hypertensive crisis in persons taking MAO inhibitors?
- A. Deficiency of vitamin A
  - B. Cheese and fermented foods
  - C. Matrix metalloproteinase
  - D. Foods rich in the amino acid glutamate
  - E. Eating filter-feeding clams and mussels out of season
7. Which of the following is correct about meiosis?
- A. It is duplicate division
  - B. Its purpose is to create diploid cells
  - C. It occurs in the subventricular zone
  - D. When it malfunctions it leads to Turner's Syndrome
  - E. All of the above
8. Which of the following is associated with increased uptake of carbohydrate by skeletal muscle cells?
- A. *GLUT3*
  - B. Fusion of cytoplasmic vesicles with cell membrane
  - C. Decreased insulin
  - D. Endocytosis
  - E. All of the above
9. Which of the following is associated with a flat ST segment and a big U wave when performing an electrocardiogram on a person with muscle weakness?
- A. Botulism
  - B. Autoimmune disease
  - C. Ingestion of pufferfish
  - D. Channelopathy
  - E. Elevated potassium
10. Why do neurons in the CNS fail to regenerate and reconnect to other neurons following trauma?
- A. Lack of a neurilemma
  - B. Blood-Brain barrier
  - C. Reduced nutrients delivered by ependymal cells
  - D. Failure of satellite cells to regulate movement of extracellular fluid

- E. Scarring of ganglia
11. What is defective in persons with cystic fibrosis?
- A. Endoplasmic reticulum
  - B. Pancreas
  - C. Transport of glycoprotein into the Golgi complex
  - D. Pineal gland
  - E. Androgen insensitivity
12. Which of the following makes electrical synapses possible in smooth muscle tissue?
- A. Cell adhesion molecules
  - B. Paired hemichannels
  - C. Exocytosis of neurotransmitter
  - D. *Vagusstoff*
  - E. All of the above
13. What is the name of the demyelinating disease where T cells attack neurolemmocytes?
- A. Guillain-Barre Syndrome
  - B. Parkinson's disease
  - C. Multiple sclerosis
  - D. Myasthenia gravis
  - E. Alzheimer's disease
14. What dangerous effect is caused by nerve gases and organophosphate pesticides?
- A. Overstimulation of cholinergic synapses
  - B. Inhibition of proteins on or just outside the postsynaptic cell membrane
  - C. Inhibition of AChE
  - D. Persistence of synaptic neurotransmitter
  - E. All of the above
15. In the article *The Sandman Cometh*, what was causing the young woman's insatiable need to sleep?
- A. Endogenous substances opening chloride channels
  - B. The flumazenil she took when her wisdom teeth were removed
  - C. Naturally occurring proteins that inhibit benzodiazepine receptors
  - D. St. John's Wort
  - E.  $\alpha$ -synuclein
16. Which of the following is associated with an imbalance of serotonin, norepinephrine, and gamma-amino butyric acid in the limbic system?
- A. Hypersomnia
  - B. Selective mutism
  - C. Lack of motivation, reduced sexual desire, and deficient cognitive functions
  - D. Neurofibrillary tangles

E. All of the above

**E. 17-26 – Two-Part Story Questions** (two points each).

-- Microglial cells were discussed at length in this class are very important for the homeostasis of the body.

17. What is the origin of microglial cells?

- A. From mitotic activity by ependymal cells
- B. Bone marrow
- C. Stem cells in cerebral ventricles
- D. Pluripotent cells in hippocampus
- E. From neuroglial progenitor cells

18. What is the function of microglial cells?

- A. Remove damaged dendrites, axon terminals, and myelin
- B. Support neuronal cell bodies in PNS ganglia
- C. Make CSF
- D. Function as neurolemmocytes
- E. Electrically insulate axons

-- In this course you have learned some significant differences between males and females as well as some significant similarities.

19. Which of the following is homologous between males and females respectfully?

- A. Scrotum and labia majora
- B. Prostate and uterus
- C. Spongy urethra and fallopian tubes
- D. Penis and areola
- E. All of the above

20. Which of the following is absent in the female sexual response?

- A. Myotonia
- B. Vasocongestion of genital organs
- C. Refractory period
- D. Blood flow into the nipples
- E. Orgasmic platform

-- The cerebrum is the largest portion of the brain, it is the brain region primarily responsible for higher mental functions, and its outer layer is divided by deep fissures, called sulci.

21. What best describes the function of the elevated ridge of gray matter located in the frontal lobes just in front of the central sulcus?
- A. Vision
  - B. Neurogenesis
  - C. Control of efferent neurons
  - D. Hearing
  - E. Rapid neural transmission via local myelinated neurons
22. What best describes the function of the elevated ridge of gray matter located in the parietal lobes just behind the central sulcus?
- A. Perception of input from sensors in the skin, muscles, tendons, and joints
  - B. Production of CSF
  - C. Innervation of skeletal muscles
  - D. Contains a large fiber tract that acts to connect and coordinate activities of the left and right hemispheres
  - E. Emits theta waves during tasks that require attention and memory

-- Cocaine is a substance that is used by large numbers of persons in our society. Therefore, it is imperative that medical professionals understand the actions of this dangerous and addictive drug.

23. Which of the following is correct about cocaine?
- A. It was the first local anesthetic used by medical professionals
  - B. It is a triple reuptake inhibitor
  - C. It stimulates the nucleus accumbens
  - D. It activates the mesolimbic pathway
  - E. All of the above
24. Which of the following best describes cocaine?
- A. It inhibits presynaptic potentials
  - B. It lowers blood pressure and leads to hypotension
  - C. It can cause strokes
  - D. It blocks calcium channels
  - E. It decreases the availability of dopamine in synapses

-- Regulation of blood osmolality is essential to our survival and is highly regulated via homeostasis.

25. To help in this process, there are osmoreceptors that change shape depending on the osmolality of the blood. Where are these osmoreceptors mainly located in the body?
- A. Pituitary gland
  - B. Endothelium lining blood vessels
  - C. Cerebral medulla
  - D. Temporal lobes
  - E. Hypothalamus
26. Which of the following occurs in persons who suffer from salt deprivation in their diet?
- A. Increased release of vasopressin
  - B. Elevated blood pressure
  - C. Increased urination
  - D. Shrinkage of osmoreceptors
  - E. Transient ischemic attacks

**F. 27-32 – Multiple Choice Questions Based Upon Projection Slides.**

Fill in the space on the Scan-Tron Sheet which corresponds to the single best response (2 points each).

27. This is an endoscopic view demonstrating an abnormal accumulation of persistent cells that have escaped from the lining of the uterus by flowing backwards through the uterine tubes into the outer pelvic cavity. Which of the following is correct about this abnormal condition caused by these escaped and persistent uterine lining cells?
- A. Typically seen in persons with the SRY gene
  - B. Best treated by elevated doses of estrogen and progesterone
  - C. By using a drug that produces a drastic reduction in FSH and LH
  - D. Only seen in persons with 22q11.2 deletion syndrome
  - E. Most frequently seen prior to menarche
28. Which of the following is associated with this image of a male's diseased genitals?
- A. Absent cremasteric reflex
  - B. Scrotal repair with a stapler
  - C. Hermaphroditism
  - D. Caused in most males by stroking the nearby inside portion of a male's thigh
  - E. All of the above

29. Which of the following is most associated with this membrane transporter found in the cells of the heart?
- A. Utilizes the release of Pi directly to cause the conformational change that allows for transport
  - B. It is an RyR1 type of ion channel
  - C. It is an example of symport
  - D. It has improved action when the patient is given ORT
  - E. It is an example of antiport
30. The patient in this photograph had a history of the uncontrolled movements shown before developing their current decline in mental function. According to your *Clinical Application*, what is associated with this patient's condition?
- A. Dyskinesia
  - B. Degeneration of the caudate nucleus
  - C. Extensive CAG repeats in their genetic makeup
  - D. Inherited autosomal dominant trait
  - E. All of the above
31. Why are the gaps in the insulating covering of this neuron between 1-2 mm in distance from the next gap?
- A. So that salutatory conduction can occur
  - B. To accommodate the limits of the cable properties of axons
  - C. To allow faster conduction of nerve impulses along the length of the neuron
  - D. Because of the high internal resistance to the spread of charges in the cytosol
  - E. All of the above
32. Which of the following is responsible for this disastrous change in a human cell?
- A. Closure of aquaporins
  - B. 0.9% dextrose solution
  - C. 8.5 g per L saline solution
  - D. 5% NaCl solution
  - E. 0.3 Osm solution

**G. 33-46 – Fill-In-The-Blank.** (2 points each)

Write your responses on the separate accompanying fill-in-the-blank answer sheet of matching color. **DO NOT WRITE THESE RESPONSES ON THE EXAM ITSELF OR ON THE SCAN-TRON SHEETS!**

33. There are two occasions during the wave of a nerve impulse when the membrane potential is zero. Cite these two occasions.
34. A deficiency of what charged ion in the blood can lead to paresthesia, tetany, and even psychiatric disorders in children?

35. What is the full name for the **category** of nerve fibers that allow you to consciously stimulate the biceps brachii muscle in your arm **and** what is the name for the **category** of nerve fibers that allow you to unconsciously stimulate the heart in your chest?
36. If a nerve impulse is an “all-or-nothing event” for a **mild** stimulus to a neuron ending and for a **strong** stimulus to a neuron ending, **then how does our brain** perceive that the first stimulus was mild and the second stimulus was strong from **this single neuron?**
37. What is the **full** name of the enzyme, within the cytoplasm of the axon terminus of the **presynaptic** cell, halts the activity of the neurotransmitters dopamine, norepinephrine, and serotonin?
38. There are **two reasons** why nerve impulses traveling along a series of neurons can only progress forwards. **Cite both of these reasons.**
39. If a postsynaptic neuron received EPSPs at **two different locations** on its surface and the end result was -55 mV at the axon hillock, **what is the full name for the augmented effect of the two EPSPs at different locations **and** what is the full name for the self-propagating change that would occur in the cytoplasmic projection leading away from the postsynaptic cell body?**
40. What is the **full name** of the illness that occurs in persons between 11-35 years of age that comes on abruptly because of a mental **conflict** or emotional **crisis** that can lead to blindness, double vision, paralysis, inability to speak, amnesia, unresponsiveness, and motor tics **and** **what is the usual outcome** of this illness?
41. What is the **full name** for the specific nocturnal activity **when you dream** (or have nightmares) about Advanced Human Physiology?
42. What is the **full name of the condition** following a stroke or brain damage that can cause a person to lose all comprehension of both written and spoken language and when they speak they use both real and made up words tossed together like a mixed salad?
43. Each tissue cell in a woman’s body inherits two X chromosomes, but one is inactivated so that only one X chromosome is active. **What is the name** of the dark spot in a woman’s cheek cells or neutrophils that is created by this inactivated X chromosome?
44. What is the **name of the phospholipid enveloped structures** in the body that contain 67% of the body’s total solvent?
45. What is the **full name** (spell it all out) of the specific protein inactivated by digitalis (digoxin)?

46. Provide two reasons why potassium is more plentiful in the cytoplasm of resting nerve cells than it is in the extracellular fluid?

**H. Essay Question (8 points).**

Use the space provided on the accompanying answer sheet to write your answer.

47. Synapses were discussed at great length in your text, in your notes, and in our class discussions. Reveal your knowledge of synapses as you answer the following four questions in your essay:
- A. When a nerve impulse arrives at a terminal bouton it triggers the release of the neurotransmitter by the process of exocytosis. What is the identity of the chemical that binds with synaptotagmin to promote this exocytosis **and** what is the group name used in class for the fusion complex proteins that are triggered to release the neurotransmitter when activated by chemically-activated synaptotagmin?
  - B. What neurotransmitter is released when neurons synapse with a motor end plate, to what specific receptors on the postsynaptic cell does this neurotransmitter bind, **and** what two chemicals then pass through this specific receptor when it opens?
  - C. What neurotransmitter is released when Cranial Nerve X synapses with the circulatory system pump, to what specific receptors on the postsynaptic cell does this neurotransmitter bind, what specific G proteins then move through the membrane to bind to a protein channel, **and** what chemical moves out of the cells when this protein channel is opened?
  - D. What is the identity of the deadly plant-based antagonist that competes with neurotransmitter for postsynaptic receptors on skeletal muscle cells **and** what is the name of the autoimmune disease where immune proteins bind to and progressively destroy postsynaptic receptors on skeletal muscle cells?

**AFTER COMPLETION OF THIS EXAM, YOU MUST TURN IN THE EXAM, THE SCAN-TRON SHEET, AND THE FILL-IN-THE-BLANK ANSWER SHEET (EVERYTHING!) TO THE TA OR UA AS YOU LEAVE THIS ROOM!!**