


“OUR BIOLOGICAL SELVES”

INTERDISCIPLINARY BIOLOGY II (BIO1201-ID) SYLLABUS

	NEW YORK CITY COLLEGE OF TECHNOLOGY The City University Of New York	School of Arts and Sciences Biological Sciences Department	
Course Information			
Course title:	Biology II (Lecture and Laboratory)	Course code:	BIO1201
Credit Hours:	4 credit hours	3 hours lecture and 3 hours lab per week for 15 weeks	
Prerequisite:	BIO1101		
Text:	Lecture	Biology by OpenStax (Rice University); free online or as iBook; print copy available on order: https://openstax.org/details/biology	
	Lab	“Biology II - BIO1201 Laboratory Manual” OER available as PDF at https://openlab.citytech.cuny.edu/oer-biology/labs/	
Website	https://openlab.citytech.cuny.edu/oer-biology/		
Material Needed	Lab coat, disposable gloves and dissecting kit (not provided)		
Course Description:	<p>This is a continuation of the Biology I (BIO1101) course, focusing on the basic description of living organisms ranging from Prokaryotes to higher Eukaryotes. Topics covered also include animal organization and description of their main organ systems, with a particular attention to how such systems work in humans. Throughout the curriculum, interdisciplinary topics, centered around 4 major themes, “History & Scientific Discoveries”, “Biology & Industry”, “Disease Impact & Public Health Policies”, “Science & Race, Gender & Social Status”, will be discussed, providing social, historical and economical contexts and connections to biology.</p>		
Grading Procedure (see Grading Policies for details)			
Lecture: 60%		Lab: 40%	
The Lecture will include <u>at least</u> 4 exams. The Lab will include <u>at least</u> 4 quizzes and 2 practicums. Individual and group papers represent 20% of the final grade			
Course Coordinators / Instructors			
Dr. Tatiana Voza		Dr. Geoff Zylstra	
(718) 260-5969	tvoza@citytech.cuny.edu		gzylstra@citytech.cuny.edu

Grading Policies

Students' performance on this course will be evaluated as follows:

Lecture: 60% of final grade (based on 4 exams and one ID essay and attendance/participation)

Lab: 40% of final grade, based on 4 quizzes and a group paper** (40% overall), fetal pig practical (50% overall) and attendance/participation.

ASSIGNMENTS		% OF COURSE GRADE	NOTE										
Lab	Lab quizzes, and lab paper account for 40% of the lab grade.	Quiz 1	2 %										
		Quiz 2	2 %										
		Quiz 3	2 %										
		Quiz 4	2 %										
		Group Paper**	8 %										
	Attendance/Participation: 10% of the lab grade		4 %	Letter grades will be determined using a standard percentage point evaluation as outlined below: A: 93-100 A-: 90-92.9 B+: 87-89.9 B: 83-86.9 B-: 80-82.9 C+: 77-79.9 C: 70-76.9 D: 60-69.9 F: Below 60									
The 2 practical exams will be 50% of the lab grade		20%											
Lecture	Lecture exams and paper count for 90 % of the lecture grade	Exam 1	10.5 %										
		Exam 2	10.5 %										
		Exam 3	10.5 %										
		Exam 4	10.5 %										
		Individual Paper *	12%										
	Attendance/Participation: 10% of the lecture grade		6 %	Percentage Category: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Lecture Exams</td> <td style="text-align: right;">42 %</td> </tr> <tr> <td>Lab Quizzes</td> <td style="text-align: right;">8 %</td> </tr> <tr> <td>Lab Practicums</td> <td style="text-align: right;">20 %</td> </tr> <tr> <td>ID Papers</td> <td style="text-align: right;">20 %</td> </tr> <tr> <td>Attendance/Participation</td> <td style="text-align: right;">10 %</td> </tr> </table>	Lecture Exams	42 %	Lab Quizzes	8 %	Lab Practicums	20 %	ID Papers	20 %	Attendance/Participation
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ID Papers	20 %												
Attendance/Participation	10 %												
Total		100%											

ALL GRADES ARE COUNTED; NONE ARE DROPPED NOR ARE THEY CURVED. NO MAKE-UPS ARE GIVEN EXCEPT AT THE DISCRETION OF THE INSTRUCTOR PENDING SUBMISSION OF WRITTEN PROOF OF REASON FOR ABSENCE

➔ **ATTENDANCE / PARTICIPATION GRADES**

Attendance/Participation grades will be based on several pop quizzes given at the start and/or end of class (first and last 5 minutes), based on reading assignments (see lecture and lab lecture schedules on pages 5-8), topics discussed in class, lab activities, etc....

Academic Integrity Policy

“Academic dishonesty includes any act that is designed to obtain fraudulently, either for oneself or for someone else, academic credit, grades, or any other form of recognition that was not properly earned. Academic dishonesty encompasses the following:

Cheating: Defined as intentionally giving, receiving, using or attempting to use unauthorized materials, information, notes, study aids, including any form of unauthorized communication, in any academic exercise. It is the student’s responsibility to consult with instructors to determine whether or not a study aid or device may be used.

Plagiarism: Plagiarism is intentionally and knowingly presenting the ideas or works of another as one’s own original idea or works in any academic exercise without proper acknowledgement of the source. The purchase and submission of a term paper, essay, or other written assignment to fulfill the requirements of a course, and violates section 213-b of the State Education Law. This also applies to the submission of all or substantial portions of the same academic work previously submitted by the student or any other individual for credit at another institution, or in more than one course.

Biology II (BIO1201) Learning Outcomes

Upon satisfactory completion of this course, the student will be able to:

- I. Discuss the contribution of disciplines such as Systematics and Taxonomy to the organization of living organisms. Provide criteria for classification and naming. Explain how organisms are evolutionarily related. Understand the concept of homology.
- II. Identify Prokaryotic organisms and distinguish them from Eukaryotes depending on their cellular characteristics. Provide examples of organisms belonging to the domain Bacteria and the domain Archaea. Elaborate over the contribution of bacterial infections to the development of diseases in the modern society. Explain the differences between Prokaryotes and Viruses and why viruses are not considered alive.
- III. List and explain the characteristics of the kingdom Protista and of the variety of organisms belonging to it. Provide examples of various kinds of protists and how they differ from each other in cell composition, organization and general behavior. Compare the relationships of protists with other organisms, including examples of parasitic and, generally, disease-causing organisms.
- IV. List and explain the characteristics of the Kingdom Fungi and of the organisms belonging to it. Distinguish between zygosporangium, ascospore and basidiospore fungi. Provide examples of the different kinds of fungi, their habitats and their survival skills.
- V. List and explain the characteristics of the kingdom Plantae and of the organisms belonging to it. Explain the concept of alternation of generations and the main differences between gametophyte and sporophyte individuals. Provide classification criteria to distinguish between different kinds of plants. Describe the differences between various plant tissues and their purpose within the plant. Analyze the main kinds of plant organs (roots, stems and leaves) and their contribution to the life cycle of plants. Describe the main steps in plants’ reproduction, and the importance of the flower as the main reproductive organ in angiosperms. Distinguish between micro- and macronutrients and their importance within the life of any plant.
- VI. List and explain the characteristics of the kingdom Animalia and of the organisms belonging to it. List the various criteria for animal classification, ranging from the type of symmetry to the presence or absence of an internal body cavity. Distinguish between invertebrates and chordates.
- VII. Describe the four main kinds of animal tissues along with examples of where they can be found in humans and of the purpose they may serve. Explain the purpose of having tissues organized into organs and organs into organ systems within the human body. Present the concept of homeostasis, along with examples of how it may function in humans.
- VIII. Describe vital processes including hemolymph/blood circulation, immunity, gas exchange, food digestion and nutrient absorption, body fluid regulation, control of nervous impulses and reproduction and be able to compare and contrast features in invertebrates versus vertebrates (including humans).
- IX. Dissect and identify the main organs in a fetal pig model. List the components of each main organ system in the provided animal model, and compare them with their counterparts in humans. Dissect and identify the main components of a sheep’s brain, and compare them with the corresponding structures in a human brain model.

City Tech General Education Common Core Learning Outcomes

Upon satisfactory completion of this course, the student will be able to:

1. Use Biology as a forum for the study of values, ethical principles, and the physical world.
2. Show curiosity and the desire to learn.
3. Engage in an in-depth, focused, and sustained program of study.
4. Employ scientific reasoning and logical thinking.
5. Derive meaning from experience, as well as gather information from observation.
6. Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.
7. Understand and navigate systems.
8. Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.
9. Value knowledge and learning.
10. Demonstrate intellectual honesty and personal responsibility.

CUNY Pathways Common Core Learning Outcomes

Upon satisfactory completion of this course, the student will be able to:

1. Identify and apply the fundamental concepts and methods of a life science.
2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation and data presentation.
3. Use the tools of a scientific discipline to carry out collaborative laboratory investigations.
4. Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.
5. Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.

CityTech Interdisciplinary Course General Learning Outcomes

Upon satisfactory completion of this course, the student will be able to:

- 1. Purposefully connect and integrate across-discipline knowledge and skills to solve problems**
Throughout this curriculum, students will have to understand and apply the scientific method, reasoning and logic while also considering limitations related to technology, beliefs and social environment. Students will have to identify issues inherent to different fields when conducting scientific research. As paths and obstacles leading to biological discoveries, knowledge and applications, will be discussed, students will also be able to reflect on the importance of troubleshooting, failures and negative results in problem solving and breakthrough advances.
- 2. Synthesize and transfer knowledge across disciplinary boundaries**
Students will learn how society, religious beliefs, economics and politics can impact biology and scientific discoveries and how in turn biological advances and knowledge affect our social experience. Discussions and documents will highlight interactions between Science (and in particular Biology) and other disciplines/fields, providing context and analysis of different case studies and applications.
- 3. Comprehend factors inherent in complex problems**
This course will allow students to understand that scientific discoveries and knowledge are not obtained linearly. Different levels of complexity and limitations will be studied through discussions on topics such as the history of discoveries, the effect of religion and politics on scientists, and biases in biomedical research.
- 4. Apply integrative thinking to problem solving in ethically and socially responsible ways**
Being able to see how different aspects of life intersect is important to problem solving and social decision-making. Biology intersects with many parts of our social lives and this course will train students how to recognize these intersections and how to simultaneously think about biology and society when making decisions. Discussions about

public policy as it relates to infectious disease, the corporate ownership of genetic information and the ways social categories like race and gender relate to science will enable students to use integrative thinking to make socially responsible decisions

5. Recognize varied perspectives

While most people have the perception that scientists focus on finding the truth or the one best solution to a problem, twenty-first century scientists need to think in flexible ways and focus on creating multiple solutions to a problem. By introducing students to philosophers of science like Thomas Kuhn that focus on epistemology (paradigm change in the creation of scientific knowledge) students will see that scientific knowledge is variable and contended. Building on this, students will study the specific experiences of scientists from different social groups and see how social expectations play a role in the lives of scientists and the recognition of their work

6. Think critically, communicate effectively, and work collaboratively

Two essay assignments, unique in a biology class, will ask students to work alone and in groups to assess both how time and place relate to scientific experimentation and how biology intersects with the rest of society. These essays force students to think about biology and society in new ways and to communicate their thoughts in writing.

*** Description of the end of semester Interdisciplinary Essay (individual project)**

Write a 2-page essay describing how biology intersects with social aspects of human life. You can think about this paper in terms of gender, race, public policy, and business or corporate influence.

Select two of the following issues and tie them together with biology in your papers.

- Public Policy
- Race
- Gender
- Business or corporate influence

The best papers will seamlessly integrate the issues you choose with biology in cohesive paper. In other words, you are relating these different issues to each other in a seamless manner. Your paper should not read like two or three separate papers addressing each issue.

Style and Format

- 2 pages
- Typed double spaced
- 12 pt Times New Roman font or equivalent
- 1 inch margins
- Your paper must have a title (the wittier the better)
- Name and section # at the top of page 1 or on the title page
- Use either footnotes or parenthetical citations to cite your sources

What is an Essay?

An essay is an argumentative paper that expresses the author's point of view on a specific topic. Essays are usually both analytical as the author is judging or critiquing something, and also descriptive as the author needs to use facts to prove the accuracy of their opinion.

Structure

Introduction – A good introduction will contain (1) a catch, (2) a thesis statement, and (3) will give an indication of how the rest of the paper will be structured.

Body – This is the portion of the paper where the author makes their argument. Here the author presents information that proves the thesis of the paper. The paragraphs in the body should flow into each other.

Conclusion – The conclusion of an essay should explain how the author proved their point. In this way the conclusion is not simply a restatement of the thesis, but a blending the thesis and the body. Tell the reader how the details you discussed in the body proved the thesis in your introduction.

**** History & Scientific Discoveries Descriptive Paper (group project)**

Write a 1-page paper describing historical experiments and complications that biological researchers faced as they developed new biological knowledge. If possible consider how the concept of paradigm change discussed earlier in the semester connect with the biological research you will discuss.

Style and Format

- 1 page
- Typed double spaced
- 12 pt Times New Roman font or equivalent
- 1 inch margins
- Your paper must have a title (the wittier the better)
- Name and section # at the top of page 1 or on the title page
- Use either footnotes or parenthetical citations to cite your sources

What is a descriptive paper?

A descriptive paper is a paper that paints a picture of a certain object, event, situation, or issue. These types of papers leave the reader with a clear impression of something they did not know about before. A high quality descriptive paper does not only present facts, but also ties those facts to a larger theme. Better papers will connect the facts of the biological research you describe to a theme present in the relationship between biology and society.

Structure

Introduction – A good introduction will contain (1) a catch, (2) a brief description of the topic, and (3) will connect that topic to a larger theme.

Body – This is the portion of the paper where the author presents descriptive information that paints the picture you are trying to create. The paragraphs in the body should flow into each other.

Conclusion – The conclusion of a descriptive paper should briefly capture the most important part of the description and link it to the theme of the paper. In this way the conclusion is not simply a summary, but a blending the information and the theme. Tell the reader how the details you discussed in the body highlight the theme of the paper. Leave the reader with a clear impression of why the topic is important

Lecture Schedule

Chapters are indicated for the 12th Edition of "BIOLOGY" by S. Mader McGraw Hill Publishers

	Topics	Textbook Pages	ID Component	ID Material	ID Assessment
Week 1	Classification of Living Organisms <ul style="list-style-type: none"> Understanding Evolution Organizing Life on Earth Systematic and evolutionary relationship between organisms 	Sections 18.1, 20.1, 20.2 (also see 47.1 & 47.2)	History & Scientific Discoveries: Evolution vs Politics or Religion	<ul style="list-style-type: none"> 20 min discussion on Linnaeus & Kuhn and paradigmatic shifts Excerpt from <i>The Structure of Scientific Revolutions</i> by T. Kuhn excerpt BBC documentary on Darwin's life and struggles (http://dai.ly/xsxbk) 	6 MCQ Exam 1
Week 2	Viruses, Bacteria and Archaea <ul style="list-style-type: none"> The Viruses: viral structure, viral reproduction, viral infections; prions & viroids The Prokaryotes - Bacteria and Archaea Domains: diversity, structure and reproduction, metabolism and ecological roles, diseases and uses 	Chap. 21 & 22			
Week 3	The Protists <ul style="list-style-type: none"> Eukaryotic origins General features of protists Protist Supergroups The Algae: green, red, brown, diatoms, Euglenoids The Protozoa (Zooflagellates, Amoebas and Ciliates) Slime & Water Molds Ecological importance 	Chap. 23	Biology & Industry: Protistology and Food	<ul style="list-style-type: none"> 20 min presentation of commercial uses for protists in food In class food labels analysis 	6 MCQ Exam 1
Week 4	EXAM 1 (Classification, Viruses, Bacteria & Archaea and Protists)				
	The Fungi <ul style="list-style-type: none"> Characteristics and structure of Fungi Reproduction of Fungi Classification of Fungi Symbiotic Relationships of Fungi: lichens, mycorrhizae 	Chap. 24			

Week 5	Evolution and Diversity of Plants – Seedless Plants <ul style="list-style-type: none"> • Origin of Plants and Colonization of Land • Characteristics of plants and Alternation of Generations ▪ Non -Vascular and Vascular plants 	Chap. 25	Biology & Industry: Ethnobotany & Pharmaceuticals	<ul style="list-style-type: none"> • 20 min discussion on Patents and Neem Oil • “Granting Community Theft.” By J. Vidal in <i>The Guardian</i> 9/8/2003 http://www.theguardian.com/environment/2003/sep/08/wto.fairtrade3 	6 MCQ Exam 2
Week 6	Seed Plants <ul style="list-style-type: none"> • Gymnosperms and Angiosperms • Monocots and Eudicots • Angiosperms Diversity and Adaptations • Angiosperm Reproductive Strategies ▪ Pollination, Fertilization and Seed/Fruit Dispersal 	Chap. 26 & Sections 32.1 32.2			
Week 7	EXAM 2 (The Fungi and Plants: Evolution, Diversity and Reproduction)				
Week 7	Evolution and Diversity of Animals <ul style="list-style-type: none"> • Introduction to Animals and their Classification: level of organization, type of symmetry, type of coelom, segmentation and embryology, protostomes and deuterostomes • Overview of Animal Phyla: Invertebrates & Vertebrates 	Sections 27.1, 27.2, 27.3 + Chap. 28 + Section 29.1			
Week 8	Animal Organization <ul style="list-style-type: none"> • Form and function • Types of tissues ▪ Homeostasis: negative and positive feedback 	Chap. 33	Science & Race, Gender, Social Status	<ul style="list-style-type: none"> • 15 min discussion on the HeLa cells history • Excerpts from <i>The Immortal life of Henrietta Lacks</i> by R. Skloots • Podcast: How HeLa Cells Work (http://www.stuffyoushouldknow.com/podcasts/hela-cells-work/) 	6 MCQ Exam 3
Week 9	Circulation <ul style="list-style-type: none"> • Overview of circulatory systems • The mammalian circulatory system, pressure and flow ▪ Blood and Blood Types 	Chap. 40			

Week 10	Immunity <ul style="list-style-type: none"> • Overview of immune systems • The immune system: specific and non-specific defenses • Antibodies ▪ Disruptions in the immune system 	Chap. 42	Diseases Impact & Public Health Policies	<ul style="list-style-type: none"> • 15 min discussion centered on articles on Ebola and Emergency Public Health Policies • CDC website visit • Online article from The Freeman Spogli Institute (FSI) (https://shar.es/1vbKu5) 	6 MCQ Exam 3
EXAM 3 (Kingdom Animalia and Animal Organization & Homeostasis, Circulation, Lymphatic System)					
Week 11	Digestion and Nutrition <ul style="list-style-type: none"> • Overview of digestive systems and adaptations to diet • Human digestive system ▪ Nutrition 	Chap. 34	Diseases Impact & Public Health Policies	<ul style="list-style-type: none"> • 20 min discussion: Bloomberg & sodas • Public Health Law Center doc: Taxing Sugar Drinks: A Tool for Obesity Prevention, Cost Saving & Health Improvement (http://publichealthlawcenter.org) 	6 MCQ Exam 4
Week 12	Respiration <ul style="list-style-type: none"> • Overview of respiratory systems • Breathing ▪ Transport of gases in humans 	Chap. 39			
	Body Fluid Regulation and Excretion <ul style="list-style-type: none"> • Osmoregulation • Waste products and excretory systems ▪ The human urinary system and its regulation 	Chap. 41			
Week 13	Nervous System <ul style="list-style-type: none"> • Overview of nervous systems • Neurons and glial cells • CNS and PNS ▪ Drug abuse and neurodegenerative diseases 	Chap. 35			
Week 14	Reproduction <ul style="list-style-type: none"> • Asexual and sexual reproduction • Fertilization • Male and female reproductive system • Regulation of human reproduction ▪ Pregnancy and infertility 	Chap. 43	Science & Race, Gender, Social Status	<ul style="list-style-type: none"> • 20 min discussion Tuskegee Syphilis Experiments • Website: U.S. Public Health Service Syphilis Study at Tuskegee 	6 MCQ Exam 4
Week 15	EXAM 4 - FINAL (Digestion -Nutrition, Respiration, Excretion, Nervous System & Reproduction) Submission deadline for the Interdisciplinary Theme Essay *				

Laboratory Schedule

“Biology II - BIO1201 Laboratory Manual” OER by T. Voza - <https://openlab.citytech.cuny.edu/oer-biology/labs/>

	Topics	ID Component	ID Material	ID Assessment
Week 1	Systematics, Taxonomy & Phylogeny <ul style="list-style-type: none"> ▪ List the taxonomic levels from the broadest to the most specific. ▪ Explain the degree of similarity and difference between organisms classified in a taxonomic table. Identify animals and plants through the use of a dichotomous key.			
Week 2	Introduction to Microbiology: Prokaryotes and Protists <ul style="list-style-type: none"> ▪ Describe the general features of prokaryotes and distinguishing features of members of the Domain Bacteria. ▪ Describe differences between bacteria and cyanobacteria. ▪ Discuss the distinctive features of each group of algae and protozoans. List examples, habitats, reproductive methods, and unique features of representative members of the Kingdom Protista.	History & Scientific Discoveries: Beliefs & Proofs	<ul style="list-style-type: none"> • 15 min discussion on the Miasma and Germ Theory of Disease 	5 MCQ Quiz 1
Quiz 1 (Taxonomy, Bacteria, Archaea and Protists)				
Week 3	Introduction to Mycology: Kingdom Fungi <ul style="list-style-type: none"> ▪ Describe the characteristic features of Kingdom Fungi. ▪ Explain the division names: Chytridiomycota, Blastocladiomycota, Neocallimastigomycota Zygomycota, Ascomycota, Basidiomycota and AM Fungi. Discuss variations in structure and the sequence of events for sexual reproduction for the major divisions of the Kingdom Fungi.	Biology & Industry: Mycology and Pharmaceuticals	<ul style="list-style-type: none"> • 15 min discussion on drugs and diseases linked to fungi • Cases studies (articles) • Discovery history of statins, antibiotics (articles) 	5 MCQ Quiz 2
Week 4	Botany: Kingdom Plantae I – Bryophytes, Ferns <ul style="list-style-type: none"> ▪ Describe the process of alternation of generations. ▪ Explain the criteria for plants classification: conducting tissue, seeds and flowers and distinctive evolutionary features ▪ Discuss similarities and differences between ferns and bryophytes. ▪ Describe the life cycles of ferns and their allies. 	Science & Race, Gender, Social Status	<ul style="list-style-type: none"> • 15 min discussion on Women in Science: • Female Biologists Biographies: - Barbara McClintock. Genetics and 	5 MCQ Quiz 2

Week 5	<p>Botany: Kingdom Plantae II – Gymnosperms & Angiosperms</p> <ul style="list-style-type: none"> ▪ Describe the life cycle of a pine tree (gymnosperm) ▪ Describe the life cycle of flowering plants (angiosperms) ▪ List and give the functions of the principal parts of a flower. ▪ Describe the structure and function of roots, stems, and leaves. <p>Observe and explain characteristics of fresh monocots and eudicots sprouts</p>		<p>Chromosomes of plants. Theories were not accepted until later developments proved her correct.</p> <p>- Rosalind Franklin. DNA structure. Influenced Crick and Watson.</p>	
Quiz 2 (Fungi & Plants)				
Week 6	<p>Zoology: Kingdom Animalia I - Lower Invertebrates</p> <ul style="list-style-type: none"> ▪ Explain and discuss animal classification (levels of organization, body symmetry, coelom, protostomes, deuterostomes) ▪ Describe the distinguishing features of members of the phylum Porifera and the phylum Cnidaria. Describe the body forms of cnidarians. Compare the feeding methods of sponges and jellyfish. Observe the feeding behavior of live hydra capturing live water fleas (daphnia; crustaceans). <p>Describe the general morphology of flatworms (phylum Platyhelminthes). Observe the morphology and behavior of live Planaria</p>			
Week 7	<p>Zoology: Kingdom Animalia II - Lower Invertebrates (continued)</p> <ul style="list-style-type: none"> ▪ Describe the general morphology, major classes and advanced characteristics of roundworms (phylum Nematoda) and rotifers (phylum Rotifera). Observe the behavior of live rotifers. ▪ Describe the general morphology of organisms of phylum Annelida and phylum Mollusca. Dissect preserved earthworms and bivalves (clams) and bivalves (clams) 			
Week 8	<p>Kingdom Animalia III – Arthropods and Chordates</p> <ul style="list-style-type: none"> ▪ Describe the general morphology, characteristics and major classes of phylum Arthropoda. Describe modifications of the exoskeleton and paired appendages of arthropods. Observe preserved insect specimens (grasshoppers) ▪ Describe the morphology, characteristics of the phylum Echinodermata. Dissect preserved sea stars (if available). 	<p>Science & Race, Gender, Social Status</p>	<ul style="list-style-type: none"> • 15 min discussion on Experimental Designs and Translational Medicine • Selection of articles on sex bias in translational medicine 	<p>5 MCQ Quiz 3</p>

	Describe the morphology, characteristics of the phylum Chordata. Dissect preserved frogs			
Week 9	UNIFORM MIDTERM PRACTICAL + Quiz 3 (Animals)			
	Vertebrate Organization – Tissues and Organs <ul style="list-style-type: none"> ▪ Describe the general properties of tissues versus single cells ▪ Describe the characteristics of epithelial, connective, muscular and nervous tissues ▪ Describe the organization of the skin as an organ made of several tissues working together 	History & Scientific Discoveries: Failures and Luck	<ul style="list-style-type: none"> • 5 min discussion on Blood Groups • Podcast: What's the deal with Blood Types (1hr 2min) https://itunes.apple.com/us/podcast/whats-deal-blood-types/id278981407?i=339613425&mt=2 	One page paper (Group project) **
Week 10	Vertebrate Anatomy I – Real & Virtual Fetal Pig Dissection <ul style="list-style-type: none"> ▪ Understand the classification of the pig as a mammal; name the unique mammalian characteristics represented by the fetal pig. ▪ Define all the anatomical terminology, planes and structures Dissect and identify the components of the digestive and respiratory systems of the fetal pig; 			
Week 11	Vertebrate Anatomy II – Real & Virtual Fetal Pig Urogenital System <ul style="list-style-type: none"> ▪ Identify, observe and dissect and the heart and pericardium; identify major blood vessels. ▪ Define, identify, and describe components of the fetal pig female and male urogenital system. 			
Week 12	Quiz 4 (Vertebrate Anatomy: Tissues, Organs and Organ Systems)			
	Vertebrate Anatomy III – Organs of Homeostasis - Urinalysis <ul style="list-style-type: none"> ▪ Define homeostasis and why it is an important characteristic of every life form ▪ Describe the structure and function of the human lungs, liver and kidneys and their role in the maintenance of homeostasis ▪ Describe the process of urine formation in the human kidney ▪ Explain and discuss negative and positive feedback mechanisms. ▪ Test urine samples, discuss and explain results 			

Week 13	<p>The Nervous System - Sheep Brain</p> <ul style="list-style-type: none"> ▪ Define and describe the components of the central and peripheral nervous systems ▪ Identify the components and basic function of the sheep brain and their human counterparts on the models available <p>Describe the structure of the spinal cord and the mechanism underlying reflexes</p>			
Week 14	<p>Quiz 5 (Physiology: Homeostasis, Organ Functions and Nervous System) Submission deadline for one-page description paper * on "History & Scientific Discoveries"</p>			
	<p>Reproduction & Development</p> <ul style="list-style-type: none"> ▪ Human male and female reproductive systems and cycles ▪ Describe the main steps in the embryological development of vertebrates ▪ Identify the various stages in the developmental models provided <p>Review for Final Practicum</p>			
Week 15	<p>UNIFORM FINAL: FETAL PIG/BRAIN PRACTICUM</p>			