

COURSE SYLLABUS

COURSE TITLE	BIOL 317 Fundamentals of Animal Physiology		
COURSE CODE	82533	TERM:	Fall term 2018-19
COURSE CREDITS	3.0	DELIVERY	3L/4P
CLASS SECTION	01	LAB LOCATION	THORV G74A
START DATE:	05-Sep	LAB TIME:	1:30 to 5:20 pm
LECTURE LOCATION:	Room 124 Biology		
LECTURE TIME:	MWF 10:30 – 11:20		
WEBSITE:	via PAWS/Blackboard		

Course Description:

Considers physical, chemical and functional aspects of animal cells and tissues. Specifically examines membrane transport mechanisms, bioelectricity and fundamental principles of muscle and nervous system physiology, evolution and plasticity. Cellular mechanisms underlying learning and memory are introduced.

Prerequisite(s): BIOL 224 or BMSC 224 (or HSC 208); CHEM 112; CHEM 115 or CHEM 250 (CHEM 115 recommended).

Note: PHYS 115 and 117 are recommended. Students with credit for BIOL 217 will not receive credit for this course.

Learning Outcomes:

By the completion of this course, students will be expected to:

1. have an in depth understanding of physiological principles and processes associated with cell membrane function
2. develop their skills in quantitative analysis of biological data
3. develop their scientific writing skills
4. be able to find and read scientific literature at an introductory level
5. develop their oral presentation skills
6. develop group working skills
7. conduct physiological experiments and collect and analyze data

8. develop an appreciation for the scientific method and actively engage in understanding new Information

Note: The University of Saskatchewan Learning Charter is intended to define aspirations about the learning experience that the University aims to provide, and the roles to be played in realizing these aspirations by students, instructors and the institution. A copy of the Learning Charter can be found at: http://www.usask.ca/university_secretary/LearningCharter.pdf More information on University policies on course delivery, examinations and assessment of student

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Course Overview:

The course consists of 50 minutes of lecture on the MWF schedule, starting on Sept 5, 2018 and ending on Dec 5, 2018. This will result in 39 days of lectures during the term (approximately 32 hours of face-to-face instruction in the lectures). Seven afternoons of hands-on lab exercises, plus an orientation and two afternoons for student presentations are also included in this course. In these exercises, you will work in small groups to perform physiological experiments and analyze your data. The experiments are used to provide a practical illustration of some of the major lecture concepts and are coordinated with lecture material as shown in the schedule below. Completion of the labs is a required course component. You will hone your scientific writing and oral communication skills through the preparation of labs reports and class presentations based on your experimental results. Each student will be responsible for completing five lab reports and giving one 15 minute oral presentation to the class. Note that the lab periods are scheduled for 3 hrs 50 minutes per afternoon; students need to make themselves available for this entire time period. At the end of five experimental lab exercises, each group is required to turn in a summary (called a Group Data Sheet) of the experimental data they collected. The Group Data Sheet must be given to the lab demonstrators before students leave the lab. There are no exceptions to this; failure to provide a Group Data Sheet will result in a deduction of 25% from the lab report prepared by each member of the group.

Detailed Course Schedule:

Week Dates Instructor	Major Lecture Topics	Laboratory Activity
Week 1 Sep 5 & 7 Dr. Benson	Nature and purpose of class; Water as the Biological Solvent (important features of biological solutions & molecular exchange in solution) No lab scheduled this week <u>Readings:</u> Textbook Chapters 1, 2 & 5; Blackboard material	Nothing due
Week 2 Sep 10, 12, & 14 Dr. Benson	Water as the Biological Solvent <u>Readings:</u> Textbook Chapter 2, 5 & 27 (part) ; Blackboard material	Orientation Lab Manual: Introduction Nothing due
Week 3 Sep 17, 19, & 21 Dr. Benson	Exchange of Materials Across Biomembranes (osmosis, ion channels, carrier mediated transport; bulk transport) <u>Readings:</u> Textbook Chapter 2 & 5; Blackboard material	Exercise #1 Molecular Exchange Group Data Sheet #1 <u>Readings:</u> Lab Manual- Exercise #1
Week 4 Sep 24, 26, & 28 Dr. Benson	Exchange of Materials continued <u>Readings:</u> Textbook Chapters 2 & 5; Blackboard material	No Lab Period Lab #1 reports due in class Sept 28.
Week 5 Oct 1, 3, & 5 Dr. Benson	Transmembrane Potentials (Gibbs- Donnan equilibrium; diffusion potentials; ionic basis of membrane charge; steady state & equilibrium potentials) <u>Readings:</u> Textbook Chapter 12; Blackboard material	Diffusion Potentials <u>Readings:</u> Lab manual - Exercise #2 Group data sheet #2
Week 6 Oct 8	No Lecture – Thanksgiving	

Week 6 Oct 10, & 12 Dr. Benson	Bioelectricity (passive vs active electrical properties; action potentials; Hodgkin-Huxley cycle; action potential conduction) <u>Readings:</u> Textbook Chapter 12; Blackboard material	Introduction to Neurophysiology Equipment <u>Readings:</u> Lab manual: Intro to Neurophysiology Equipment C.V. & Rate of Decay Calculation
Week 7 Oct 15 & 17 Dr. Benson Oct19 Dr. Angrini	Bioelectricity (conclusions) Midterm Exam on Oct 17 at class time <u>Readings:</u> Textbook Chapter 12; Blackboard material Midterm exam on material to end of Bioelectricity Intercellular Communication <u>Readings:</u> Textbook Chapter 13; Blackboard material	Exercise #3 Compound Action Potentials <u>Readings:</u> Lab Manual: Exercise #3 Group Data sheet
Week 8 Oct 22, 24, & 26 Dr. Angrini	Intercellular Communication (continued) (neurotransmitter release; synaptic & neuromuscular transmission; chemically sensitive ion channels) <u>Readings:</u> Textbook Chapter 13; Blackboard material	Exercise #4 Skeletal Muscle Contraction <u>Readings:</u> Lab manual - Exercise #4 Lab #3 Reports due Group Data Sheet #4
Week 10 Oct 29, 31, & Nov 2 Dr. Angrini	Intercellular Communication (continued) Muscle Physiology (muscle types; contractile units; sliding filament theory; excitation-contraction coupling smooth vs. striated muscle) <u>Readings:</u> Textbook Chapters 13 and 20; 21 Blackboard material	Lab #4 Tutorial <u>Readings:</u> Lab manual - Exercise #4 Nothing due

Week 11 Nov 5, 7 & 9 Dr. Angrini	Muscle Physiology (conclusions) Signal Transduction Across Membranes (general mechanisms; mechanoreceptors; photoreceptors; visual and infrared spectra; phonoreceptors; middle ear receptors; lateral line receptors) <u>Readings:</u> Textbook Chapters 2 and 14; Blackboard material	Lab #5 Sensory Receptors <u>Readings:</u> Lab manual - Exercise #5 Group Data Sheet #5
Week 12 Nov 12 to 16	No Lectures or Labs Break Week	.
Week 13 Nov 19, 21 & 23 Dr. Angrini	Signal Transduction Across Membranes (continued) <u>Readings:</u> Textbook Chapter 14; Blackboard material	Lab #5 Reports Student Presentations on Labs 1-3
Week 14 Nov 26, 28 & 30 Dr. Angrini	Nervous Integration & Regulation (Basic concepts; animal models of memory & learning; evolution of the nervous system; vertebrate brain structure & function; autonomic nervous system) <u>Readings:</u> Textbook Chapters 13 and 15; Blackboard material	Student Presentations on Labs 4 & 5
Week 15 Dec 3 & 5 Dr. Angrini	Nervous Integration & Regulation (continued) Course wrap-up <u>Readings:</u> Textbook Chapters 13 15; Blackboard material	
	Final Examination during regular exam period.	

* Additional readings may be assigned as the course proceeds. These will be noted during the lectures or in the lab manual as appropriate.

Instructors:

Contact Information:

Dr. James Benson	Room 320.2 Collaborative Sciences Research Building 306-966-4404	james.benson@usask.ca
Dr. Manar Angrini	room 220.2 Collaborative Sciences Research Building 306-966-4437	manar.angrini@usask.ca
Ms Sheri Fisher (lab coordinator/instructor)	Room G77.3 Thorvaldson 966-4431	sheri.fisher@usask.ca

Office Hours: Generally speaking, the instructors above will be available in their offices on a drop-in basis. However, please note that all instructors have other commitments that may take them away from their office. Specific appointments can be set by email or over the phone. Email responses to specific questions about course material are at the discretion of each instructor.

Instructor Profiles & Other Information:

Dr. Benson and Dr. Angrini are faculty members in the Department of Biology. Ms Fisher holds an advanced degree (MSc) and is responsible for coordinating all aspects of the laboratories for BIOL 317. Note that your lab group will also be assigned a laboratory demonstrator who will assist you during the lab periods and be responsible for grading your lab reports and presentation. The lab demonstrators work under Ms Fisher's supervision and are senior undergraduate or graduate students at the University.

Text book and Required Resources:

Hill, Wyse & Anderson. 2016. Animal Physiology 4 ed, Sinauer. This is available from the University of Saskatchewan Bookstore: <http://www.usask.ca/bookstore/>

Laboratory Manual for BIOL 317 (will be available as a download from the course Blackboard)

Electronic Resources

The laboratory portion of this course will require a working knowledge of computers and various computer programs, including MS Excel, Word and PowerPoint. Computers will be used extensively to collect and analyze data and prepare reports in the laboratory. You will need to access your University computer account during the laboratory; make sure you know your university nsid and password and how to log on to your account. Further details are in the lab manual.

Downloads

These will be available as appropriate through the course Blackboard. The only documents that you are required to download and read are the course syllabus and the lab manual. Please note that instructor's PowerPoint slides may be provided to you as a courtesy. You are not required to download or print these slides. While we will endeavor to have the lecture PowerPoint slides posted sometime in advance of the lectures, we will not guarantee this. Each

instructor will provide you with additional information about their downloads.

Supplementary Resources

From time to time, your instructors may make supplementary material available to you through the course Blackboard. This material will not replace the lecture or lab experience and you are encouraged to attend all lectures and take your own notes. A number of paper-based resources for the laboratory may be placed on reserve for you in the Natural Sciences Library; information about these is provided in the lab manual as appropriate.

Grading Scheme:

Overall, assessment is designed to ensure students have attained the learning outcomes for the course.

Assessment Item	Weighting	Due Date and Time
Mid-Term Exam	25% of the final course grade	Refer to Course Timetable
Final Exam	40% of the final course grade	Refer to Course Timetable
Lab Reports (five)	30% of the final course	Refer to Course Timetable
Oral Presentation (one)	5% of the final course	

Learning Assessment Details:

Midterm Exam

Value: 25% of final course grade

Date: Oct 25 (to be written in the lecture period)

Length: 50 minutes

Format: a mix of multiple choice questions and those requiring a written answer.

Description: Will include all of Dr Benson lecture material (ie to the end of the Bioelectricity lectures). Non graphing calculators allowed. No phones, laptops, tablets or other materials allowed.

Final Exam

Value: 40% of final grade

Date: Consult the Final Exam Schedule when it is released.

Length: 3 hours

Format: a mix of multiple-choice questions and those requiring a written answer.

Description: The exam is comprehensive in that it will cover all lecture material. However, material

delivered since the midterm exam will be emphasized. Calculators allowed. No phones, laptops,

tablets or other material allowed. Students should plan to be in Saskatoon during the final exam period as the BIOL 317 final exam could be scheduled on any day during this period.

Laboratory Reports:

Value: 30% of final grade

Due Date: See Course Schedule for exact dates

Format: Each student must independently write a report for each of the five lab exercises. A hardcopy (paper) of the report must be submitted according to the schedule shown above.

Description: Comprehensive information about the format and style to be used for these reports is contained in the lab manual and will be explained in detail during the orientation lab. Generally, each report will consist of several pages of writing plus a number of Figures and/or Tables depicting the results obtained in the lab exercise. Students are required to know and understand what constitutes plagiarism and the University's Regulations on Academic Student Misconduct (see below). Reports 1 & 2 will be worth 5% of the final grade; Reports 3 and 4 will be worth 7% each and Report 5 will be worth 6%. Note that failure to turn-in a Group Data Sheet will result in a 25% deduction from that lab report mark for each student in the group.

Lab Presentation:

Value: 5% of final grade

Date: See Course Schedule for exact dates.

Format: 15 minute PowerPoint presentation

Description: Each student will be required to give one presentation detailing and explaining the results obtained during one of the lab exercises. Presentation topics are assigned randomly in the lab orientation period. Students who fail to attend both days of student presentations will receive a 2.5 mark deduction from their final course grade.

Submitting Assignments/Feedback to Students

Each student must independently write a report for each of the lab exercises. A hardcopy (paper) of the report must be submitted as shown in the Course Schedule (no exceptions to this). The lab reports will be graded by lab demonstrators who will also watch for plagiarism. Reports will be graded and returned on a schedule such that students will have feedback about their work after they have submitted the first report.

Grades will be assigned based on the quality of the data presentation, grammar, spelling, scientific writing and other aspects of the report. Additional information about the format of the reports is contained in the lab manual; students must read this carefully. The oral presentation will be evaluated by Ms Fisher, two lab demonstrators and other students in the lab section. A rubric and weighting scheme for assessing the presentation will be posted on Blackboard. Presenters will be provided with written feedback about their performance. Marks from the midterm exam will be available 7 to 10 days after the exam, well in advance of the last day to withdraw deadline.

Late Assignments/Missed Lab Deadlines:

Lab reports submitted after the deadline will be penalized by a 10% reduction in the mark assigned to the report for each day that the report is late. Students who miss a deadline due to a protracted illness or extenuating personal circumstances are required to contact the lab coordinator (an email or phone call to Ms Fisher is adequate) on the day the assignment is due and discuss the reasons why the deadline is being missed. There are no exceptions to this policy; students who fail to proactively advise the lab coordinator that they will miss the deadline

will be subject to the 10% per day penalty. Depending on the situation, additional documentation may be requested from the student. Deadline extensions will only be provided when the protracted illness or extenuating personal circumstance is verifiable. Ms Fisher may consult with Dr. Benson and/or Angrini during this verification process. Similar procedures must be followed by a student if they are going to miss giving their scheduled lab presentation. Note that failure to turn-in a Group Data Sheet will result in a 25% deduction from that lab report mark for each student in the group (see above).

Attendance Expectations:

Students are expected to attend all lectures and all scheduled lab periods. It is impossible to schedule make-up labs for this course. A student who does not attend a laboratory activity and does not have a valid excuse, will receive a grade of zero for any assignment associated that activity. Students who fail to attend both days of student presentations and who do not have a valid excuse based on illness or extenuating personal circumstances will receive a 2.5 mark deduction from their final course grade.

Criteria That Must Be Met to Pass:

Students must write the final exam in order to pass the course. Students who do not write the final exam will be assigned a final course grade of 49%, or lower depending on their performance in other aspects of the course, along with a grade comment of INF (Incomplete Failure). The final grade will be adjusted if a deferred final exam is written (see below).

Midterm and Final Examination Scheduling:

Midterm and final examinations must be written on the date scheduled. Final course examinations may be scheduled at any time during the examination period; students should therefore avoid making prior travel, employment, or other commitments for this period. If a student is unable to write an exam through no fault of his or her own for medical, compassionate or other valid reasons, documentation must be provided and an opportunity to write the missed exam may be given. Note: students should consult the laboratory manual for information specific to missed laboratories. Students who miss the final exam must contact the College of Arts & Science and apply for a deferred final exam. Deferred exams may utilize a different format than the regular exam, at the sole discretion of the course instructors. Students are encouraged to review all University examination policies and procedures:
<http://students.usask.ca/academics/exams.php>

Copyright:

All previously-published material is used this course under the fair-use provisions of Canadian copyright legislation. The instructors retain copyright of their own work. Students shall refrain from redistributing any material provided to them, except with the permission of the instructors.

Student Feedback:

The Department of Biology or the instructors may survey students regarding the course. This is generally done through an in-class assessment near the end of term.

University of Saskatchewan Grading System:

Students in BIOL 317 are reminded that the University has established a grading system to be used in all of its courses. Information on literal descriptors for grading at the University of Saskatchewan (reproduced below) can be found at:

<http://students.usask.ca/academics/grading/grading-system.php>

Exceptional (90-100) A superior performance with consistent evidence of

- a comprehensive, incisive grasp of the subject matter;
- an ability to make insightful critical evaluation of the material given;
- an exceptional capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

Excellent (80-90) An excellent performance with strong evidence of

- a comprehensive grasp of the subject matter;
- an ability to make sound critical evaluation of the material given;
- a very good capacity for original, creative and/or logical thinking;
- an excellent ability to organize, to analyze, to synthesize, to integrate ideas, and to express thoughts fluently.

Good (70-79) A good performance with evidence of

- a substantial knowledge of the subject matter;
- a good understanding of the relevant issues and a good familiarity with the relevant literature and techniques;
- some capacity for original, creative and/or logical thinking;
- a good ability to organize, to analyze and to examine the subject material in a critical and constructive manner.

Satisfactory (60-69) A generally satisfactory and intellectually adequate performance with evidence of

- an acceptable basic grasp of the subject material;
- a fair understanding of the relevant issues;
- a general familiarity with the relevant literature and techniques;
- an ability to develop solutions to moderately difficult problems related to the subject material;
- a moderate ability to examine the material in a critical and analytical manner.

Minimal Pass (50-59) A barely acceptable performance with evidence of

- a familiarity with the subject material;
- some evidence that analytical skills have been developed;
- some understanding of relevant issues;
- some familiarity with the relevant literature and techniques;
- attempts to solve moderately difficult problems related to the subject material and to examine the material in a critical and analytical manner which are only partially successful.

Failure <50 An unacceptable performance

Integrity Defined (from the Office of the University Secretary)

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.

Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at:

<http://www.usask.ca/secretariat/index.php>

All students should read and be familiar with the Regulations on Academic Student Misconduct as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals available on the University Secretary Website.

Important Note: Additional information about student misconduct specific to BIOL 317 is found in the laboratory manual. BIOL 317 students are required to read and understand the information about misconduct that is presented in the laboratory manual.

Examinations with Access and Equity Services for Students (AES):

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Access and Equity Services for Students (AES) if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals. In order to access AES programs and supports, students must follow AES policy and procedures. For more information, check <http://www.students.usask.ca/disability/>, or contact AES at 306-966-7273 or aes@usask.ca.

Students registered with AES may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AEs.

Student Supports:

Student Learning Services

Student Learning Services (SLS) offers assistance to U of S undergrad and graduate students. For information on specific services, please see the SLS web site <https://www.usask.ca/ulc/>.

Student and Enrolment Services Division

The Student and Enrolment Services Division (SESD) focuses on providing developmental and support services and programs to students and the university community. For more information, see the SESD web site <http://www.usask.ca/sesd/>.