UNIVERSITY OF SASKATCHEWAN

COURSE SYLLABUS

COURSE TITLE:	*The Diversity of Life*		
COURSE CODE:	Biol. 121 – CRN: 82344	**TERM:**	01
COURSE CREDITS:	3	**DELIVERY:**	Lecture and laboratory
CLASS SECTION: **CLASS LOCATION:** **CLASS TIME:** **WEBSITE:**	1 Arts 241 T, Th from 10:00-11:20 am Accessible via Blackboard on PAWS	**START DATE:** **LAB LOCATION:** **LAB TIME:**	Sept. 4, 2019 Room 218, Biol. Bldg. 1:30-4:30 pm

Course Description

Our world has at least 15 million species, all of which have adapted to particular environments with different life histories to use energy to grow and reproduce. We examine these processes in representative organisms from all the major groups, and discuss factors influencing changes in biodiversity over time and space.
Prerequisite(s): Biology 30 or BIOL 107 or BIOL 108.
Note: Students with credit for BIOL 110 will not receive credit for BIOL 121.

Course Overview

This course is designed to introduce you to the vast and exciting field of biology, with a focus on biological diversity, evolution, adaptations of organisms to specific environments, and the evolutionary and ecological factors influencing changes in biodiversity over time and space.

Learning Outcomes

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

- have an understanding of biological principles (concepts), and that evolution is the unifying principle in biology
- gain an appreciation for biology as an experimental science [hence, provide necessary background for advanced study of biology and other related disciplines], and realize that an understanding of biological principles requires knowledge of other fields of science (chemistry, physics, geology, geography, mathematics, biochemistry) and many disciplines within biology (e.g. evolution, ecology, genetics, physiology, structure and function, ethology, parasitology, molecular biology, etc.)
- obtain knowledge of the diversity and complexity of life, which includes how organisms are adapted to their environment and the variation (e.g. morphological, genetic, physiological, behavioral) that exists among individuals of the same species and between individuals of related species
- be able to think critically regarding scientific issues in our society and understand the importance of relationships between organisms and their environment, and how biodiversity is constantly changing

Specifically, students should know:

- the characteristics that unite all living organisms, and why viruses and prions are considered non-living entities
- the differences between unicellular/multicellular organisms and heterotrophs/autotrophs
- that different organisms reproduce in different ways; sometimes using more than one mode of

reproduction; and the advantages/disadvantages of asexual/sexual reproduction
- that water represents the matrix or solvent of life
- the biological species concept and other ways to define species; the hierarchical system of nomenclature
- that there is difference between species and variation among individuals in, for example, their morphology, genetics, ethology, ecology, physiological responses to the same environmental conditions, etc.
- that museums represent the catalogues of the diversity of life both in time and space
  the definition of biological diversity; and the problems with quantifying species diversity
- that species are not fixed in time; what Darwin saw and how he made conclusions about his observations that led to the theory of evolutionary change by means of natural selection; and the evidence to support this theory
- that some organisms are more suited (better adapted) to their environment, but that this is no guarantee of survival and opportunity to reproduce; the concept of reproductive fitness
- that variation is essential for natural selection to work; natural selection acts on individual organisms but evolutionary change take place at the population level
- the differences between microevolution/macroevolution; the principles of homology, analogy and homoplasy; allopatric species, adaptive radiation, and that evolution is unidirectional
- the difference between natural selection/sexual selection; importance of the differences (diversity) between sexes
- the difference between biotic and abiotic factors; influence of abiotic factors on the reproductive fitness of organisms
- that there is considerable ecosystem diversity – and that environments and the organisms in them have changed over time
- what were the first organisms that lived on earth, the importance of O_2 in changing species diversity, why did multicellularity come about, the conquest of land and air (by multiple groups) and the challenges organisms faced and how they were overcome [examples of adaptation]
- when the ancestors of the representative organisms appeared on earth
  that species diversity has changed over time in response to major environmental changes; e.g. mass extinctions, climatic change [pre-human effects
- what is symbiosis and the types of symbiotic relationship; coevolution [arms-race; predator-prey, parasite-host] and the role these play in changing biological diversity; the role of competition
- the interrelationships of organisms and biodiversity; concepts of niche, food webs/chains
- the relationship between species diversity and the theory of island biogeography
- the relationship between community structure (and trophic relationships) and species diversity in communities
- the effect of human (Anthropogenic) influences [fire, invasive species, habitat fragmentation, mining, etc.] on biodiversity over space and time [past, present, future]; including the Canadian prairies
- the concept of biological hotspots, and why the need to converse biological diversity

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 the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at: http://www.usask.ca/university_secretary/council/academiccourses.php

Class Schedule

Week Day(s)	**Major Lecture Topics**	**Recommended Readings**	**Lab Topic** (see lab manual for details)
1 Sept 4-6	Course Introduction - 25 representative organisms; pioneers and scholars in biology; inductive & deductive reasoning; scientific method	Purple pages section F2-5, 15-17; Ch. 21	**NO LAB**
2 Sept 9-13	Living & Non-living Entities	Ch. 21	LAB 1 - Introduction & Prokaryotes
3 Sept 16-20	Introduction to biodiversity	Ch. 22	LAB 2 - Protists
4 Sept 23-27	Classification of organisms; Systematics and phylogenetics	Ch. 19	LAB 3 - Fungi
5 Sept. 30-Oct 4	Intraspecific & interspecific variation; Microevolution	Ch. 16, 17	LAB 4 – Plants I Green algae, mosses, ferns & club mosses
6 Oct 7-11	Intraspecific & interspecific variation; Macroevolution	Ch. 18	LAB 5 – Plants II Conifers & Angiosperms
7 Oct 14-18	Macroevolution & Changes in biodiversity through time **Mid-Term Exam Oct. 15 – 5:30-6:20 pm**	Ch. 21	**NO LABS** – OCT 14th. THANKSGIVING HOLIDAY - MONDAY
8 Oct 21-25	Changes in biodiversity through time	Ch. 21	LAB 6 – Animals I Sponges, Cnidarians, Flatworms & Nematodes
9 Oct 28-Nov 1	Biodiversity today		LAB 7 – Animals II Mollusks, Annelids & Arthropods
10 Nov 4-8	Interactions between organisms and effects on biodiversity		LAB 8 – Animals III Echinoderms & Chordates
11 Nov 11-15	**Mid-term break – No lectures**		**Mid-term break No lab**
12 Nov 18-22	Interactions between organisms and effects on biodiversity		REVIEW LAB
13 Nov 25-29	Human influences on biodiversity		**FINAL LAB EXAM**
14 Dec 2-6	Human influences on biodiversity and Review Lecture		**NO LAB**

Note: Suggested readings are based on Russell *et al*. 2018

Laboratory class information:

1. Labs begin the week of Sept. 9th. – Biol. Room 218. **Make sure you have registered for a lab on-line.** Students are expected to attend and be on time for all scheduled labs, review labs and final lab exams. The lab schedule is provided on the previous page of this document.
2. **The current edition of the Biology 121.3 lab manual is required for all labs** (this item can be purchased from the Bookstore in Marquis Hall). For your labs you may also need a 2H, 3H or 4H drawing pencil, an eraser, white (unlined) drawing or loose-leaf paper for notes, a calculator and a metric ruler.
3. Any other questions regarding the lab should be directed to the laboratory staff in Room 216. See page 2 of the lab manual for contact telephone numbers.

Instructors, Course Coordinator & Lab Coordinator

Contact Information:

Dr. Hugo Cota-Sánchez - Lecture Instructor (1st half); CSRB 320.9; Email: hugo.cota@usask.ca
Dr. Jeff Hudson - Lecture Instructor (2nd half); CSRB 120.5; Email: jeff.hudson@usask.ca
Dr. Neil Chilton – Course Coordinator; CSRB 320.6; Email: neil.chilton@usask.ca
Mr. Joel Yurach - Lab Coordinator; room 216 Biology Bldg.; Email: joel.yurach@usask.ca

Recommended Resources

Textbook: Russell PJ, Hertz PE, McMillan B, Fenton MB, Maxwell D, Haffie T, Milson B, Nickle T, Ellis S. 2018. *Biology: Exploring the Diversity of Life*. 4th Canadian Ed., Nelson Education.
ISBN 978-0-17-671888-6 (Hard- copy); 978-0-17-682709-0 (PDF); ebook includes access to MindTap

Required Resources

Laboratory Manual - Biology 121.3 Laboratory Manual (2019-2020 Ed.). Purchase at the main bookstore, Marquis Hall)

Downloads

These will be available as appropriate through the course Blackboard. The only document that you are required to download and read is the course syllabus. **Please note that instructor's Power-point slides or lecture notes may be provided to you as a courtesy**. You are not required to download or print these slides/notes. While the instructors will endeavor to have the lecture Power-point slides/notes posted sometime in advance of the lectures; however, they will not guarantee this. Each instructor will provide you with additional information about their downloads.

Grading Scheme

INPUT	% OF GRADE	IMPORTANT DATES
Midterm exam	15%	15 Oct. 2019
Final exam	45%	Consult University Final Exam Schedule
Lab assignments and quizzes	20%	Weekly - during lab.
Lab exam	20%	Nov. 25-29, 2019
Total	100%	

Note: Cell phones, calculators, laptops, tablets, and all other electronic devices ARE NOT ALLOWED during examinations and quizzes.

Last day to withdraw from the course without academic penalty is Friday Nov. 15, 2019

Evaluation Components

Midterm Exam:
Date and Length: The midterm lecture exam will be held on **October 15, 2019** - 50 minutes time
Format: 40 multiple-choice questions; machine (opscan) marked
Description: It will include all lecture's material to end of Microevolution & Macroevolution.
Value: 15% of final course grade

Final Exam:
Date and Length: Consult the University's Final Exam Schedule **-** 3 hours
Format: 100 multiple-choice questions; machine marked
Description: The exam is comprehensive in that it will cover all lecture material. However, material delivered after the midterm exam will be emphasized.
Value: 45% of final course grade

Laboratory Assignments & Quizzes:
Value: 20% of final course grade
Date and **Format:** see Laboratory Schedule; Quizzes (written); spot tests; flower project
Description: Quizzes will be 15-20 minutes in duration and test material from the previous two or three lab exercises. The questions will generally require a short written answer. Spot tests involve images shown in PowerPoint and short questions about the specimen shown. Additional information about the lab quizzes can be found in your lab manual and will be given in the weeks prior to the assignment.

Laboratory Exam:
Value: 20% of final course grade
Date and Length: Week of Nov. 25-29, 2019 - 1.5 hours
Format: This will be a mixture of spot test, short written answers and possibly practical questions (slide prep, etc.)
Description: The exam is comprehensive in that it will cover all laboratory classes.

University of Saskatchewan Grading System

Students in BIOL 121 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/current/academics/grades/grading-system.php

Scheduling of Exams

- Students must bring current University of Saskatchewan student card to all exams and be prepared to present it for verification purposes. Entry into certain campus buildings where exams may be held, also requires a valid student card.
- It is forbidden for students to utilize in any way during an exam, electronic devices (e.g., cell phone, dictionary, palm pilot, translator, etc.). This includes calculators, which are not required for exam.
- Midterm, final examinations, and the lab exam, must be written on the date scheduled. Final exams may be scheduled at any time during the examination period in December 2019; students should therefore avoid making prior travel, employment, or other commitments for this period.
- In the event that a student is absent from the **midterm exam** through no fault of his/her own due to a medical emergency, death in the family, or other valid reasons, documentation must be provided explaining the absence, to assist in the determination of whether permission will be granted for the student to write a deferred mid-term exam.
- Students absent for the Mid-Term Exam **must advise their Instructor in person or by telephone (not by email) and initiate arrangements for writing a Deferred Mid-Term Exam, within 3 working days of the missed exam**, in order to avoid being assigned a grade of zero for the exam.

- If a student is absent from the **final exam** through no fault of his or her own for medical or any other valid reason, **he/she must apply to the Dean's Office of the College in which he/she is registered for an opportunity to write a Deferred Final Exam, within 3 working days of the missed exam**. Documentation must also be provided to explain the absence from the final exam. Deferred exams may utilize a different format than the regular exam, at the sole discretion of the instructors.
- Consult page 2 of the Lab Manual for the procedure to follow for a missed Lab Exam. Students are encouraged to review all examination policies and procedures at: http://www.usask.ca/calendar/exams&grades/examregs/

Student Feedback

Marks from machine-graded exams are usually available within one week. Multiple-choice questions will not be posted after the exam. Students are encouraged to meet with the instructor to review their performance.

Attendance Expectations for Laboratory Classes

Students are expected to attend all scheduled lab periods. Students are advised to consult the lab manual for further information about BIOL 121 procedures to follow when they are too ill to attend the lab period (and/or lab exam) or are facing extenuating personal circumstances.

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.

All students should read and be familiar with the Regulations on Academic Student Misconduct (http://www.usask.ca/university_secretary/honesty/StudentAcademicMisconduct.pdf) as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (http://www.usask.ca/university_secretary/honesty/StudentNon- AcademicMisconduct2012.pdf)

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/university_secretary/pdf/dishonesty_info_sheet.pdf

Important Note: *Additional information about student misconduct specific to BIOL 121can be found in the laboratory manual. BIOL 121 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 examinations for students who are being accommodated by the deadlines established by AES.