COURSE SYLLABUS

COURSE TITLE: Grasses and Grasslands

COURSE CODE: Biol. 424 - CRN: 20036
TERM: 02
COURSE CREDITS: 3
DELIVERY: Lecture and Lab

CLASS SECTION: 1
CLASS LOCATION: Room 4C77, Ag. Bldg.
CLASS TIME: Tuesday & Thursday 8:30-9:50 am
ACCESSIBLE VIA BLACKBOARD ON PAWS

START DATE: Jan. 5
LAB LOCATION: Room 4C77, Ag. Bldg.
LAB TIME: Monday 1:30-5:30 pm

Course Description
- A study of the morphology, systematics, phylogeny, biogeography, synecology and autoecology of grasses and other graminoid species, including ecology and management of grasslands.
- Laboratory emphasis is on the structure and taxonomy of grasses and grass-like plants and recognition of representative species of Saskatchewan.

Prerequisites
- BIOL 121 and 222 (formerly 202 or 205); or permission of the instructor.

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

1) Understand grass phylogeny and evolution,
2) Recognize and identify grass and grass-like species using dichotomous keys or distinctive morphological traits,
3) Describe grasses, grassland structure and function and understand classification of grasslands,
4) Discuss key concepts of grassland ecology at population, community and ecosystem levels,
5) Demonstrate knowledge of grassland ecology in the context of conservation and management.

Information on literal descriptors for grading at the University of Saskatchewan can be found at:

More information on the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at:

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.
Course Overview

- In this course students are introduced to grass morphology, physiology, and an overview of its phylogeny and evolution. In addition, the morpho-physiological adaptations, reproductive strategies, and evolution of grasses are investigated along with an exploration of relevant ecological concepts at the population, community and ecosystem levels. We consider key ecosystem processes that shape grassland environments and discuss current issues of grassland conservation and management.

- This course provides a global perspective of grasses and grassland ecology with emphasis on the temperate grasslands of North America.

Class Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
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</thead>
<tbody>
<tr>
<td>Jan. 5</td>
<td>Course introduction</td>
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<tr>
<td>Jan. 7</td>
<td>Grass morphology</td>
<td>Judd et al. 2016, pp. 312-317</td>
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<tr>
<td>Jan. 11</td>
<td>Lab 1 – Grass morphology, leaf and Kranz anatomy</td>
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<tr>
<td>Jan. 14</td>
<td>Grass leaf anatomy, photosynthetic pathways &amp; adaptations</td>
<td>Kellogg 2001; Edwards et al. 2010</td>
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<td>Jan. 18</td>
<td>Lab 2 – Basal lineages of grasses</td>
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<tr>
<td>Jan. 21</td>
<td>Grass Systematic (Phylogeny) – II</td>
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<tr>
<td>Jan. 25</td>
<td>Lab 3 – BEP Clade – Pooidae I (Bromeae, Aveneae &amp; Tritriceae)</td>
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<tr>
<td>Jan. 26</td>
<td>Reproductive biology in grasses</td>
<td>Soderstrom et al. Ch. 12</td>
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<td>Jan. 28</td>
<td>Grasslands of the world</td>
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<tr>
<td>Feb. 1</td>
<td>Lab 4 – Pooidae II – Other rep. genera of Pooidae</td>
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<td>Feb. 2</td>
<td>North American grasslands</td>
<td>TBD</td>
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<td>Feb. 4</td>
<td>Grassland ecosystem – Guest Lecture – R. Vera</td>
<td>TBD</td>
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<td>Feb. 8</td>
<td>Lab 5 – PACCAD Clade- Aristidoideae</td>
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<td>Feb. 9</td>
<td>Rare and invasive grasses</td>
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<td>Feb. 11</td>
<td>Midterm 1 - through Feb. 4</td>
<td>TBD</td>
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<td>Feb. 15-19</td>
<td>Reading Week – No Class</td>
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<td>Feb. 22</td>
<td>Lab 6 - Panicoideae</td>
<td>TBD</td>
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<td>Feb. 23</td>
<td>Guest lecture</td>
<td>TBD</td>
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<tr>
<td>Feb. 25</td>
<td>Guest lecture</td>
<td>TBD</td>
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<tr>
<td>Feb. 29</td>
<td>Lab 7 – Chloridoideae &amp; Centothecoideae</td>
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<td>March 1</td>
<td>Jacey – Range Plants &amp; Grassland Ecosystem - Grazing</td>
<td>TBD</td>
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<td>March 3</td>
<td>Jacey - Grassland Ecology - Goods and Services</td>
<td>TBD</td>
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<td>March 7</td>
<td>Lab 8 – Arundinoideae and Danthonioideae</td>
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<td>March 8</td>
<td>Jacey - Grassland Restoration</td>
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<td>March 10</td>
<td>Midterm 2 – through March 8</td>
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<td>March 14</td>
<td>Lab 9 - Cyperaceae and Juncaceae I</td>
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<td>March 15</td>
<td>Jacey - Grassland Conservation</td>
<td>TBD</td>
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<td>March 17</td>
<td>Jacey - Grassland Management &amp; Assessment</td>
<td>TBD</td>
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<tr>
<td>March 21</td>
<td>Lab 10 – Cyperaceae and Juncaceae II</td>
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<td>March 22</td>
<td>Guest lecture – Dr. Eric Lamb</td>
<td>TBD</td>
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<td>March 24</td>
<td>Guest lecture</td>
<td>TBD</td>
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<td>March 28</td>
<td>Lab 11 - review</td>
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<td>March 29</td>
<td>Economic uses and ethnobotany of grasses</td>
<td>TBD</td>
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<td>March 31</td>
<td>Grass domestication I - Corn</td>
<td>TBD</td>
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<td>April 4</td>
<td>Lab 12 – Lab final practicum</td>
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<td>April 5</td>
<td>Grass domestication II - Wheat</td>
<td>TBD</td>
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<tr>
<td>April 7</td>
<td>Review</td>
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Instructor Information
Dr. Hugo Cota-Sánchez, Professor and Curator

Contact Information
Office: Room 141, Biology Building. Tel. 966-4405
Email: hugo.cota@usask.ca

Office Hours
TR 10:30 am -1:00 pm, Biol. 141

Instructor Profile
Hugo was born in Mexico. He has a B.Sc. in Biology from the Escuela Nacional de Ciencias Biológicas, M.Sc. in Botany from the Claremont Graduate University, and a Ph.D. in botany from Iowa State University. He was a postdoctoral fellow and research associate at the Missouri Botanic Garden (1998-2000) while simultaneously supervising the DNA sequencing and plant molecular systematics labs at the University of Missouri-St. Louis.

At present, he is a full professor in the Department of Biology and herbarium curator at the University of Saskatchewan, Canada. He has been the recipient of four Teaching Excellence awards. He has taken several administrative roles, including membership in the Cactaceae Specialist Group for the World Conservation Union (1996-), board of directors for the Flora of Saskatchewan Association (2007-), and board of directors for the Canadian Botanical Association (2004-2007).

Hugo speaks English, French, Portuguese and Spanish and frequently travels to Mexico and other parts of Central and South America to conduct collaborative fieldwork. His research interests within the cactus family are: 1) systematics and phylogeny, and 2) reproductive biology, with emphasis in the biology and evolution of viviparity. In his role as curator of the W.P. Fraser Herbarium he conducts floristic, taxonomic, and biodiversity studies dealing with carnivorous plants and other native species of Saskatchewan. His lab and herbarium research programs are funded by national, provincial and international agencies.

Laboratory Instructor
Jacey Bell
Room University of Saskatchewan
email: jacey.bell@usask.ca

Jacey Bell completed her B.Sc. (Hon.) in Biology at the University of Saskatchewan in 2010 and has over 7 years of experience working with plants including positions as a summer research assistant at the Crop Development Centre, and as a botanist at an environmental consulting company. She has gained teaching experience through the Let’s Talk Science outreach program and has completed courses in the College of Education. Jacey has worked for the University of Saskatchewan as a teaching assistant for several terms since 2008 and has previously assisted with teaching Biol. 120 labs and tutorials, and Biol. 222 and 424 labs.
Resources
Required:

Readings/Textbooks – (Recommended)

Textbooks are available from the University of Saskatchewan Bookstore: www.usask.ca/consumer_services/bookstore/textbooks AND the U of S Sciences library.

**Online Resources**
Overview of the Angiosperm Phylogeny Group, and phylogenetic schemes of Monocots, Poales and Poaceae visit: [http://www.mobot.org/MOBOT/Research/APweb/welcome.html](http://www.mobot.org/MOBOT/Research/APweb/welcome.html)

**Supplementary Resources**
- Laboratory handouts will be provided on a weekly basis by the instructor.
- Links to online resources will be provided for reading assignments.
Grading Scheme

REQUIRED EXAMINATION, COURSE WORK, AND GRADING SYSTEM

<table>
<thead>
<tr>
<th>INPUT</th>
<th>% OF GRADE</th>
<th>IMPORTANT DATES</th>
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<tbody>
<tr>
<td>Theory Mid-term I</td>
<td>15%</td>
<td>February 11</td>
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<tr>
<td>Mid-term II</td>
<td>15%</td>
<td>March 10</td>
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<tr>
<td>Lab quizzes</td>
<td>10%</td>
<td>Every week</td>
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<tr>
<td>Laboratory Final</td>
<td>25%</td>
<td>April 4</td>
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<tr>
<td>Comprehensive Theory Final Exam</td>
<td>35%</td>
<td>April ???</td>
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Criteria that must be met to pass
Students must complete all the assignments indicated above. Students who DO NOT complete one or more assignments will receive an "INC" (incomplete) grade

Evaluation Components
See above
MIDTERM 1 and 2 will be written and scheduled during class time (90 min).

All exams will be cumulative, i.e., cover all material studied from the first day of class until the date of the exam. We will, however, emphasize material covered since the last exam. There will also be approximately 5-8 laboratory quizzes (15 minutes each), worth 10% of your final grade.

LABORATORY FINAL – Will last four hours and will be held the last lab of the term. It includes the proper identification of preserved specimens as well as the determination of several subfamilies and genera of the grass family. Taxonomic keys and botanical glossaries will be provided.

Mid-term and final exams:
There will be two mid-term exams. The mid-term and final exams will test material covered in lecture and any of the assigned readings. The exams will include a combination of fill-in-the-blank, short answer questions and essay questions. Material covered from the start of the course up to the date of the exam is eligible to be included on an exam.

Missed exams / Make-up policy:
You must take examinations during their scheduled periods. Make-up tests will be allowed only if there are extenuating circumstances, in which case the test will be given orally. If there is a medical problem that causes a student to miss an exam, the student must contact the instructor within 3 days of the exam to provide documentation of the illness and make arrangements for a make-up exam. Failure to do so will result in a zero grade for the exam.

Note that Laboratory sessions are very important because that is where you will learn and reinforce a great deal of information about material discussed in lecture.

Attendance Expectations and Participation
Note that; class attendance, participation and overall performance in lecture and lab will also be considered in your final grade.

ABOUT THE LAB

Philosophy – A significant part of the learning experience in this course is in the laboratory portion. This is where we will discuss and debate various ideas, as well as examine fresh materials (flowers!) that will generally not be available to students who miss the lab.
Remember that this is an integrative course and that lecture and laboratory sessions make up the entire content of this course. Hence, the exams will include material from both components.

There will be no make-up lab sessions!

**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:


**Examinations with Disability Services for Students (DSS)**

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

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