UNIVERSITY OF SASKATCHEWAN

COURSE SYLLABUS

COURSE TITLE:	*Plant Systematics and Evolution*		
COURSE CODE:	Biol. 323 – CRN: 81866	**TERM:**	01 - Fall 2023
COURSE CREDITS:	3	**DELIVERY:**	Lecture and laboratory
CLASS SECTION: **CLASS LOCATION:** **CLASS TIME:** **CANVAS WEBSITE:**	1 Geol. 161 M, W, F from 9:30-10:20 am https://canvas.usask.ca/courses/25972	**START DATE:** **LAB LOCATION:** **LAB TIME:**	Sept. 6, 2023 Thorvaldson 132 Monday 1:30-5:20 pm

Instructor Information

J. Hugo Cota-Sánchez, Ph.D.
Collaborative Science Research Building (CSRB), Office 320.9
Tel. 966-4405; email: hugo.cota@usask.ca

Office Hours: MW 10:30 am -12:00 pm, or by appointment

Instructor Profile
http://artsandscience.usask.ca/profile/HCotaSanchez
http://www.usask.ca/biology/cota-sanchez/lab/

I love plants, nature and my pets, among other things. My teaching inside and outside of the classroom consists in helping new generations of plant biologists to master a strong body of scientific knowledge while promoting the development of critical thinking, systematic literacy, and writing skills. I believe in the effectiveness of incorporating live teaching material supported by both traditional and dynamic multimedia resources, either face-to-face or in a virtual environment.

My research program involves the study of plant evolution and reproductive biology. As a curator, we investigate the taxonomy, distribution, conservation and rarity status of Saskatchewan's native plants.

Catalogue Description

Biol. 323 introduces vascular plant diversity. It encompasses basic principles of plant systematics (methods of classification, description, nomenclature, taxonomy and identification keys), practical experience with the identification of vascular plants, and tempos and patterns of plant distribution, reproduction, speciation and evolution.

Prerequisites: Biol. 121 and Biol. 222 or instructor's approval.

Land Acknowledgement

As we gather here today, we acknowledge that the Saskatoon campus of the University of Saskatchewan is on Treaty Six Territory and the Homeland of the Métis. We pay our respect to the First Nation and Métis ancestors of this place and reaffirm our relationship with one another. We recognize that in the course of your studies you will spend time learning in other traditional territories and Métis homelands. We wish you safe, productive and respectful encounters in these places.

Learning Outcomes

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

- Master the basic concepts of nomenclature and classification.
- Understand the structure, function and relationship between flowers, fruits, and seeds as well as floral evolution and pollination syndromes across different plant lineages.
- Acquire general knowledge about plant structure and the necessary terminology to identify plants using dichotomous keys. Emphasis is on the flora of Saskatchewan.
- Understand plant phylogeny and tempos and modes of origin, evolution and diversification of land plants, emphasizing major flowering plant groups.
- Develop an appreciation of the fundamental role of plant taxonomy, botanical and natural history collections to other disciplines.

Information on literal descriptors for grading at the University of Saskatchewan can be found at:
http://students.usask.ca/academics/grading/grading-system.php

Please note: There are different literal descriptors for undergraduate and graduate students.
More information on the Academic Courses Policy on course delivery, examinations and assessment of student learning can be found at:

http://policies.usask.ca/policies/academic-affairs/academic-courses.php

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:

https://teaching.usask.ca/about/policies/learning-charter.php

Course Overview

Welcome to Biol. 323 – *Plant Systematics and Evolution*.
In this course we will learn very neat things about plant lifestyles, evolutionary history, scientific names, uses and relationships with humans (and other animals).

We will also learn to improvise and be creative to learn basic botanical language, principles of classification, and the associated phylogeny and evolutionary history of plants. I make special efforts to provide as much support as I possibly can.

Philosophy – I am aware that many of the concepts we teach in botany are highly technical. This is why I employ interactive and engaging and experiential teaching methods to make the subject matter more likeble and interesting to all students.

A significant part of the experiencial learning in this course includes hands-on learning different plant lineages and native plants both in lecture and labs in a fun and interesting manner. We will learn to distinguish plant structures and their associated functions and taxonomic occurrence. I expect that we all engage in discussion of various interesting ideas, as well as examine fresh materials (flowers!).

Supplies needed to dissect plant parts: You will need several small lab tools, including 2 dissecting needles, forceps, ruler, and a single-edge razor blade. A 10X hand-lens is highly recommended.

Class Schedule

Date	Lecture Topic	Reading Assignment	Lab Topic
Sept. 6	Course overview - Introduction to Plant Systematics	Ch. 1 pp 1-11	
Sept. 8	Classification: Types and History	Ch. 3 pp. 49-63	
Sept. 11	Botanical Nomenclature	Appendix 1: 589-599; Ch. 4 pp. 65-73	Lab 1 – Veget. Struct.
Sept. 13	Flower and Fruit Evolution - I	Ch. 4 pp. 73-94	
Sept. 15	Flower and Fruit Evolution - II		
Sept. 18	Molecular Systematics & Cladistics	Ch. 2 pp. 13-23	Lab 2 – Repr. Struct..
Sept. 20	Overview of Vascular Plant Phylogeny I	Ch. 6 pp. 157-181	
Sept. 22	Ferns	Ch. 7 pp. 194-216	
Sept. 25	Gymnosperms	Ch. 7 pp. 217-231	Lab 3 – Ferns & Gym.
Sept. 27	Vascular Plant Phylogeny II	Ch. 8 pp. 237-244	
Sept. 29	ANA Grade	Ch. 8 pp. 244-249	
Oct. 2	Magnoliid Complex, Non-Monocot Paleoherbs	Ch. 8 pp. 250-262	4 - ANA & Magnoliid
Oct. 4	Monocots I – Phylogenetic overview	Ch. 8 pp. 263	
Oct. 6	**MIDTERM I (through Oct. 4th & Lab 4)**		
Oct. 9	**NO CLASS** – Thanksgiving		
Oct. 11	Monocots II – Zingiberales & Poales	Ch. 8 pp. 300-322	
Oct. 13	Monocots III – Grasses – Poales (continued)	Ch. 8 pp. 312-319	
Oct. 16	Eudicots – Basal Tricolpates	Ch. 8 pp. 323-334	Lab. 5 Monocots
Oct. 18	Superrosids - Fabids	Ch. 8 pp. 335	
Oct. 20	Superrosids - Malvids		
Oct. 23	Superasterids - Caryophyllales I	Ch. 9 pp. 318-342	Lab. 6 - Superrosids
Oct. 25	Superasterids - Caryophyllales II		
Oct. 27	Cactaceae		
Oct. 30	Asterids I	Ch. 9 pp. 441-508	Lab. 7 –Superasterids
Nov. 1	Asterids II		
Nov. 3	**MIDTERM II (through Oct 27 and Lab 7)**		
Nov. 6-10	**NO CLASS** – Fall mid-term break		
Nov. 13	TOUR: Herbarium: Uses, Purposes, Services	Appendix 2: pp. 553-565 Collection management	8 - Project ID Lab
Nov. 15	Angiosperm origins and diversity - I	T.F. Stuessy Paper	
Nov. 17	Angiosperm origins and diversity - II		
Nov. 20	Reproductive Biology & Pollination	Ch. 4 pp. 67-72	9 - Project ID Lab
Nov. 22	Plant Speciation	Ch. 6 pp. 119-132; 144-46	
Nov. 24	Hybridization	Ch. 6 pp. 132-144	
Nov. 27	Polyploidy	Ch. 6 pp. 132-144	10 – Project ID Lab
Nov. 29	Areas of Plant Diversity	*Plants, People & Planet.* 2021. 3:33-44	
Dec. 1	Antrhopoghenic biomes of the world	*Front Pl Ecol.* 2008. 8:439	Plant Collection Due
Dec. 4	Biodiversity Hotspots & Conservation	TBA	
Dec. 4	**LAB FINAL**		11 - Final Lab Exam
Dec. 6	Conclusions		
Dec. 8	Review Qs & As		
Dec. ??	Theory Final – TBD by USASK exam schedule		

Note: Readings assignments are based on Judd et al. 2016 (see recommended resources)

Midterm and Final Examination Scheduling
Midterm and final examinations must be written on the date scheduled.
Final examinations may be scheduled at any time during the examination period (Dec. 9 - 22); 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 or other valid reasons, documentation must be provided and an opportunity to write the missed exam may be given. Students are encouraged to review all examination policies and procedures:
http://students.usask.ca/academics/exams.php

Length and Mode of Final Examination
Theory Final – The final lecture exam will have a duration of 3 hours and will encompass a combination of multiple choice, short and essay questions.

Laboratory Final – It will be held the last laboratory session and will have a duration of 3 hrs.

Required Activities Outside of Class Time
N/A

Required and Recommended Resources
Lecture:
- Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. and Donohue, M.J. 2016. *Plant Systematics: A Phylogenetic Approach*, 4th Ed., Sinauer Assoc., Inc. ISBN: 0-87893-403-0. Call No: QK95.P58 2008. Sections of the e-book will be made available on Canvas.
- Simpson, M.G. 2010. *Plant Systematics.* 2nd. Ed., Elsevier Acad. Press. Amsterdam. ISBN: 9780123743800. Call No. QK95.S566.
- *Supplementary Lecture Notes and Lab Handouts for Biol. 323* will be made available by Dr. Cota-Sanchez. Additional handouts will be posted on Canvas before lab sessions whenever necessary.

Electronic Resources
- Simpson, M.G. 2010. *Plant Systematics.* 2nd. Ed., Elsevier Acad. Press. Amsterdam. ISBN: 9780123743800. Call No. QK95.S566. The e-book will be made available on Canvas.

Supplementary Laboratory Resources
- Harris, J.G. and M.W. Harris. 2001. *Plant Identification Terminology. An Illustrated Glossary.* 2nd Ed. Spring Lake Publishing.
- Moss, E.H. 1983. *Flora of Alberta*. 2nd. Ed. Rev, by Packer, J. G. University of Toronto Press. Harms, V.H., and A. Leighton. 2011. *Ferns and Allies of Saskatchewan,* fascicle 1. Flora of Saskatchewan Association, Nature Saskatchewan, Regina, SK.
- Harms, V.H., and A. Leighton. 2011. *Lilies, Irises and Orchids of Saskatchewan,* fascicle 2. Flora of Saskatchewan Association, Nature Saskatchewan, Regina, SK.
- Leighton, A. 2012. *Sedges (Carex) of Saskatchewan.* Flora of Saskatchewan, fascicle 3. Flora of Saskatchewan Association, Nature Saskatchewan, Regina, SK.
- Leighton, A., and V.H. Harms. 2014. *The Grasses of Saskatchewan,* fascicle 4. Flora of Saskatchewan Association, Nature Saskatchewan, Regina, SK.

Assessment Details

Grading Scheme

REQUIRED COURSE COMPONENTS	% OF GRADE	DATE(S)
Theory midterm I	10%	October 6, 2023
Theory midterm II	10%	November 3, 2023
Laboratory final exam	15%	December 4, 2023
Lab quizzes & assignments	10%	Every lab session
Plant collection	25%	During lab sessions – Due Dec. 1, 2023
Theory final	30%	December ???, 2023 – Univ. Exam
Total	100%	

Evaluation Components

See above and descriptors below.

Midterm 1 and 2 will be written and scheduled during class time (50 min).
Value: Each midterm is worth 10% of final grade.
Date: See Course Schedule
Type: These exams will be in-person during class time.
Description: These exams consist of fill-in the blanks, short answers, and essay question(s) about topics discussed in lecture. Electronic devices will not be permitted.

Final Exam will be written (three hours) and scheduled by USASK's Exam Schedule Office.
Value: Final exam is worth 30% of final grade
Date: As determined by scheduling office
Type: This is a closed-book in-person exam.
Description: The exams consist of fill-in the blanks, short answers and essay questions.
Note that this exam 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. Electronic devices will not be permitted.

Laboratory Final Exam
Value: Final exam is worth 15% of final grade. Three hours
Date: Dec. 4, 2023
Type: The exam will consist in the proper identification (plant family, genus and species, including nomenclatural rules) of three different native plant species using dichotomous keys (provided by instructor). The specimens provided will be herborized. Electronic devices will not be permitted.

Plant Collection
Value: This is an individual summer project worth 25% of the final grade.
Date: Dec. 1, 2023 or earlier.
Type: Individual project at student pace.
As indicted in early emails, a personal plant collection consisting of 40 native (not cultivated) plants properly pressed, identified and labelled is a requirement to complete this course. Students without plant collection will be unable to complete this course. This project is aimed to train students in plant parts

and identification skills. Identification of plants will be conducted during laboratory sessions and instruction for labelling specimens will be provided during labs and visit to the university herbarium.

Laboratory Quizzes
A short written evaluation dealing with content material of previous lab session will be conducted at the beginning of every lab during the five first weeks. That is, before we concentrate in the identification of the personal plant collection. The quizzes are short direct, 10-15, questions regarding plant structures that are defining characteristics for certain plant families. The evauation and discussion of the quiz results will immediately follow the quiz.

Attendance Expectations for Lecture and Laboratory Sessions

Students are expected to attend all scheduled lecture and lab periods. Students are advised to consult the lecture schedule for further information about the Biol. 323 lab content. This is helpful when students are too ill to attend the lab period (and/or lab exam) or are facing extenuating personal circumstances. Please note that thos course is quite intense in content and that a missed lecture may affect the understanding of other concepts discussed in subsequent lectures.

Submitting Assignments

With the exception of the plant collection which is due on December 1, 2023, by 3:00 pm, at the latest, no other assignment is required. Each specimen must be fully identified and labelled. Detailed instructions will be provded in the laboratory.

Missed Exams/Assignments

- 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.

Criteria That Must Be Met to Pass

Completion of ***all*** required course components as indicated in the Grading Scheme category are compulsory to pass the course.

Attendance Expectations

Students are expected to attend all lectures and lab sessions. Please notify and contact your instructor (via email) if you are unable to attend classes. Also, communicate with you classmates to obtain lecture notes.

Experiential Learning

This component won't be evaluated, but students are encouraged to participate actively in lecture, laboratory sessions, and get involved with plant parts and functions in their own living environment and neighboring parks. Participating and communicating **makes learning fun and it is** very important to effectively enhance your abilities to **learn and** identify plants and their parts on the spot. Therefore, it is extremely important that students devote extra time to develop the minimum skills and knowledge to identify plants.

Recording of the Course

Your instructor will not record any of the lectures. Similarly, students are not allowed to record any aspect of this course, except with the permission of the instructors or as provided for by arrangements with Access and Equity Services.

Any recording made under these provisions are to only be used for the personal learning of the student who made the recording. For questions about recording and use of sessions in which you have participated, including any concerns related to your privacy, please contact your instructor.

Copyright

Course material created by your professors and instructors is their intellectual property and **cannot be shared without written permission**. This includes exams, PowerPoint/PDF lecture slides and other course notes. If materials are designated as open education resources (with a creative commons license) you can share and/or use them in alignment with the CC license. Other copyright-protected materials created by textbook publishers and authors may be provided to you based on license terms and educational exceptions in the Canadian Copyright Act.

You are responsible for ensuring that any copying or distribution of materials that you engage in is permitted by the University's "Use of Materials Protected By Copyright" Policy. For example, posting others' copyright-protected materials on the open internet is not permitted by this policy unless you have copyright permission or a license to do so. For more copyright information, please visit https://library.usask.ca/copyright/students/index.php or contact the University Copyright Coordinator at copyright.coordinator@usask.ca or 306-966-8817.

Student Feedback

I will welcome student feedback on course components, evaluations and lecture material. Your feedback is significant to improve delivery of lecture and lab material.

Academic Integrity

The University of Saskatchewan is committed to the highest standards of academic integrity. https://academic-integrity.usask.ca/

Students are urged to read the Regulations on Academic Misconduct and to avoid any behaviours that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.

For help developing the skills for meeting academic integrity expectations, see: https://academic-integrity.usask.ca/students.php

Students are encouraged to ask their instructors for clarification on academic integrity requirements.

All students are encouraged to be aware of the rules for courses set out in the Academic Courses Policy on Class Delivery, Examinations, and Assessment of Student Learning.

Access and Equity Services (AES) for Students

Access and Equity Services (AES) is available to provide support to students who require accommodations due to disability, family status, and religious observances.

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to

register with Access and Equity Services (AES) if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals at any time. Those students who are registered with AES with mental health disabilities and who anticipate that they may have responses to certain course materials or topics, should discuss course content with their instructors prior to course add / drop dates.

Students who require accommodations for pregnancy or substantial parental/family duties should contact AES to discuss their situations and potentially register with that office.

Students who require accommodations due to religious practices that prohibit the writing of exams on religious holidays should contact AES to self-declare and determine which accommodations are appropriate. In general, students who are unable to write an exam due to a religious conflict do not register with AES but instead submit an exam conflict form through their PAWS account to arrange accommodations.

Any student registered with AES, as well as those who require accommodations on religious grounds, may request alternative arrangements for mid-term and final examinations by submitting a request to AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AES.

For more information or advice, visit https://students.usask.ca/health/centres/access-equity-services.php, or contact AES at 306-966-7273 (Voice/TTY 1-306-966-7276) or email aes@usask.ca.

Student Supports

Academic Help – University Library

Visit the University Library and Learning Hub to find supports for undergraduate and graduate students with first-year experience, study skills, learning strategies, research, writing, math and statistics. Students can attend workshops, access online resources and research guides, book 1-1 appointments or hire a subject tutor through the USask Tutoring Network

Connect with library staff through the AskUs chat service or visit various library locations on campus.

Enrolled in an online course? Explore the Online Learning Readiness Tutorial.

Teaching, Learning and Student Experience

Teaching, Learning and Student Experience (TLSE) provides developmental and support services and programs to students and the university community. For more information, see the students' website http://students.usask.ca.

College Supports

Students in Arts & Science are encouraged to contact the Undergraduate Student Office and/or the Trish Monture Centre for Success with any questions on how to choose a major; understand program requirements; choose courses; develop strategies to improve grades; understand university policies and procedures; overcome personal barriers; initiate pre-career inquiries; and identify career planning resources. Contact information is available at: (http://artsandscience.usask.ca/undergraduate/advising/).

Financial Support

Any student who faces unexpected challenges securing their food or housing and believes this may affect their performance in the course is urged to contact Student Central https://students.usask.ca/student-central.php.

Gordon Oakes Red Bear Student Centre
The Gordon Oakes Red Bear Student Centre) is dedicated to supporting Indigenous student academic and personal success. The Centre offers personal, social, cultural and some academic supports to Métis, First Nations, and Inuit students. The Centre is an intercultural gathering space that brings Indigenous and non-Indigenous students together to learn from, with and about one another in a respectful, inclusive, and safe environment. Visit https://students.usask.ca/indigenous/index.php or students are encouraged to visit the ASC's website https://students.usask.ca/indigenous/gorbsc.php.

International Student and Study Abroad Centre
The International Student and Study Abroad Centre (ISSAC) supports student success and facilitates international education experiences at USask and abroad. ISSAC is here to assist all international undergraduate, graduate, exchange, and English as a Second Language students in their transition to the University of Saskatchewan and to life in Canada. ISSAC offers advising and support on matters that affect international students and their families and on matters related to studying abroad as University of Saskatchewan students. Visit https://students.usask.ca/international/issac.php for more information.