

## COURSE SYLLABUS

COURSE TITLE:	BIOL 380.3 Research Experience in Biology – Forest Mushroom project		
COURSE CODE:	86650	TERM:	Fall 2022
COURSE CREDITS:	3.0	DELIVERY:	In person
CLASS SECTION:	01	1st MEETING	Sep 7 2022
WEBSITE:	via Canvas (see PAWS)	LOCATION:	G11 Thorv
		TIME:	Th 1:30-4:20 pm

### Course Description

This course is designed to provide students with an introduction to biological research. Students will study a research question with a faculty supervisor, through a combination of a research literature review and practical work. A written report and an oral presentation are required.

**Weekly hours:** 5 Practicum/Lab hours

**Prerequisite(s):** Completion of 12 cu of senior BIOL courses and permission of the department. BIOL 301 is strongly recommended.

**Note:** Students are required to obtain a faculty supervisor prior to registration in this course. Students are encouraged to complete this course in their 3rd year. BIOL 480 or BIOL 481 may subsequently be completed for credit, provided that the topic studied for BIOL 480 or BIOL 481 is substantially different than that studied in BIOL 380. The written report submitted for completion of this course will be maintained on file in the Department.

### 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.

### Important Guidelines for this Term:

During the continued presence of COVID-19, it is important that we undertake in-person elements of this class safely. The University has created [Health and Safety webpage](#) where all up-to-date information around returning to campus is listed. You are responsible for **regularly** checking these guidelines and knowing what is expected of you throughout the fall term. Like the University, your instructors **strongly encourage you to wear face masks** during class activities. If you test positive for COVID-19 follow the instructions on the webpage, which includes notifying your instructors about this.

### Course Overview & Learning Outcomes

This section of BIOL 380 consists of weekly practicum meetings (approximately 3 hours) on Monday afternoons (with the exception of the week of Sept 6 to 9, when we will meet on

Wednesday Sept 7 in lieu of the Labour Day holiday). The Department of Biology has over 600 forest mushroom specimens collected from the Boreal forests of Saskatchewan. Students will document morphological characteristics (with light microscopy and SEM techniques) and generate DNA sequence data for these specimens. These data will be compared to literature descriptions and DNA databases in order to confirm specimen identification. Students will be required to meet on a weekly basis to perform laboratory work; results of lab work will be recorded by each student in a laboratory notebook. Research performance will be based on attentiveness to deadlines and a consistent work ethic over the course of the term. Each student will also research a 12 to 15 page review article on a subject related to the project. During this project students will acquire and develop skills in library/literature searches, the ability to compare/contrast and synthesize data from multiple sources of information on a single biological topic, and writing and oral presentation skills; learn lab protocols and lab safety; expand their skills at morphological analysis; learn practical molecular biology skills including DNA extraction, PCR amplification and amplification targeted on the ITS region, basic, sequence searching and bioinformatic analysis skills; contribute to documenting Saskatchewan mycoflora diversity and ecology.

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

More information on University policies on course delivery, examinations and assessment of student learning can be found at: <http://policies.usask.ca/policies/academic-affairs/academic-courses.php>

## **Class Schedule**

<b>Week Dates</b>	<b>Course Activities</b>	<b>Submission of Coursework</b>
<b>Week 1</b> Sept 1 to 2	No activity scheduled	Nothing due
<b>Week 2</b> Sept 5 - Labour Day Holiday  Sept 7 <b>Wednesday special day</b>	Scope of the Project Information about the literature review & writing an annotated bibliography What is a thesis statement? Using Web of Science and Endnote effectively Copyright considerations Information about the research notebook requirement	Nothing due
<b>Week 3</b> Sep 12 Monday	Introduction to fungal morphology, ecology and phylogeny (Jacey Bell & Tracy Marchant)*	Nothing Due
<b>Week 4</b> Sep 19 Monday	Specimen description & morphology (drawing, photograph & light microscopy) Culture set-up	Research Notebook Entry (submit via Canvas)
<b>Week 5</b> Sep 26 Monday	Culture results Specimen prep for SEM	Research Notebook Entry (submit via Canvas)
<b>Week 6</b> Oct 3 or 5 Mon or Wed	SEM imaging (sign up for one day this week) (with Guosheng Liu)	Research Notebook Entry (submit via Canvas)

<b>Week 7</b> Oct 10 Thanksgiving Holiday	No meeting scheduled, finalize thesis statement & annotated bibliography for submission	Thesis statement & annotated bibliography due Oct 14 4:30 pm (submit via Canvas)
<b>Week 8</b> Oct 17 Monday	DNA extraction & preparation from dried and cultured specimens - week one (with Andres Posso-Terranova)	Research Notebook Entry (submit via Canvas)
<b>Week 9</b> Oct 24 Monday	DNA extraction & preparation - week two (with Andres Posso-Terranova)	Research Notebook Entry (submit via Canvas)
<b>Week 10</b> Oct 31 Monday	DNA extraction & preparation - week three if needed (otherwise this is a flex week – work on literature review)	Research Notebook Entry (submit via Canvas)
<b>Week 11</b> Nov 7 to 11	<b>No Lectures or Labs Fall Term Break Week</b>	
<b>Week 12</b> Nov 14 Monday	DNA results and analysis	Research Notebook Entry (submit via Canvas)
<b>Week 13</b> Nov 21 Monday	Specimen identification – integrate morphology and DNA results	Research Notebook Entry (submit via Canvas)
<b>Week 14</b> Nov 28 Monday	Flex week to finish lab work (if needed). Otherwise work on literature review and presentation.	Research Notebook Entry as needed (submit via Canvas)
<b>Week 15</b> Dec 5 Monday	Presentation of Results & Literature Review	Powerpoint submit by 1:30 pm on Dec 5 (via Canvas)  Literature review submit by 4:30 pm on Dec 7 (via Canvas).

\* Additional readings will be listed in Canvas as appropriate.

## **Instructors:**

### **Contact Information:**

Dr Tracy Marchant

room 120.3 CSRB

966-4420

tracy.marchant@usask.ca

Jaycee Bell, Guosheng Liu and Andre Posso-Terranova will assist with portions of this course (contact information will be provided later).

**Instructor Profiles & Other Information:** Dr Marchant is a faculty member/professor in the Department of Biology. She holds advanced degrees (MSc, PhD) and teaches and conducts research in the general area of animal physiology and vertebrate biology. Most recently, Dr Marchant has been overseeing the reorganization of the Department's Natural History Collection where the mushroom specimens are held. This has led to an interest in finding ways to use the Collection to provide novel learning opportunities for undergrads. Dr Marchant will be ably assisted by content and technical experts from within the Department.

## Required Resources

Written course materials will be provided as downloads or links from the Course Canvas. Students will need to have a clean lab coat and safety goggles for the DNA extraction labs.

## Grading Scheme

Assessment Metric:	Date(s) Grade is to be Assigned:
Practical Research Performance (25%)	Oct 14 (10%) & Dec 7 (15%)
Research Notebook (25%)	Oct 14 (10%) Dec 7 (15)%
Literature Review (40%)	Annotated bibliography Oct 14 (10%); final paper (30%) Dec 7
Oral Presentation (10%)	Dec 5 to 7
Total (100%)	

## Evaluation of Student Performance

### Practical Research Performance

**Value:** 25% of final course grade

**Description:** Will include an assessment of the care and exactitude used to complete practical work in the course. Includes an assessment of adherence to deadlines, instructions and safety guidelines, plus overall initiative, attentiveness to detail and effort expended to obtain results. There will be an initial assessment and feedback provided about halfway through the course. A rubric for this assessment will be posted on the course Canvas.

### Research Notebook

**Value:** 25% of final grade

**Description:** Students are required to keep a record of the work they do in each practicum as listed in the course schedule. Details of work accomplished methods used for that work and the results obtained are to be typed in a Word document and submitted at the end of each research period. Images or other computer generated results are to be uploaded with the research notebook entry. Handwritten drawings or notes are to be photographed or scanned and uploaded. A low resolution version of digital images should be added to the word version of the lab noted book. Consult the example notebook entry and a rubric on the course Canvas for more details. There will be an initial assessment and feedback provided about halfway through the course.

### Literature Review – Thesis Statement & Annotated Bibliography

**Value:** 10% of final grade

**Description:** These represent initial work toward the final literature review and is to be based on the literature research that has been conducted prior to the due date (in mid term). Instructions for writing a thesis statement and preparing the annotated bibliography and a rubric will be available on the Course Canvas.

### Literature Review – Final Paper

**Value:** 30% of final grade

**Description:** This is to be 10 to 12 pages in length (literature cited section not included in this) written on a topic in mushroom biology selected by each student based on their own interests and approved by the course insuctor. The review will be a

comprehensive summary and discussion of recent primary research findings in the selected area. The scope of the topic for the literature review will be need to be appropriate for the 10 to 12 page limit for this assignment. The review should utilize primary research articles published fairly recently. A topic that has been reviewed within the last five years would generally not be a suitable topic for this review, unless there has been substantial new research conducted in that area. Additional information about the literature review and a rubric will be available on the course Canvas. The literature review should be written with the intent of submitting this for publication in the University of Saskatchewan Undergraduate Research Journal (USURJ) <https://usurj.journals.usask.ca/>

### Oral Presentation :

**Value:** 10% of final grade

**Description:** Each student will be required to give an oral powerpoint presentation explaining major findings with regard to their specimen and to summarize the major points of their literature review. The target length of the presentation will be decided later (depends on the number of students in the course), but would not exceed 30 minutes (including audience questions).

### Attendance Expectations

Students are expected to attend all scheduled course activities. It is impossible to schedule make-up labs for some aspects of this course. Contact the course instructor in a timely manner if a course activity is missed to due to illness or other extenuating circumstance.

### Copyright

Course materials are provided to you based on your registration in the class, and anything created by your professors and instructors is their intellectual property, unless materials are designated as open education resources. Copyright-protected material includes exams, PowerPoint/PDF slides and other course notes. Additionally, 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 (see <http://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>).

**Before you copy or distribute others' copyright-protected materials, please ensure that your use of the materials is covered under the University's Fair Dealing Copyright Guidelines available at <https://library.usask.ca/copyright/general-information/fair-dealing-guidelines.php>.** For example, posting others' copyright-protected materials on the open web is not covered under the University's Fair Dealing Copyright Guidelines, and doing so requires permission from the copyright holder.

For more information about copyright, please visit <https://library.usask.ca/copyright/index.php> where there is information for students available at <https://library.usask.ca/copyright/students/rights.php>, or contact the University's Copyright Coordinator at <mailto:copyright.coordinator@usask.ca> or 306-966-8817.

### Student Feedback

The Department of Biology or the instructors may survey students regarding the course. This is generally done through an 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 (<https://academic-integrity.usask.ca/>). Academic misconduct is a serious matter and can result in grade penalties, suspension, and expulsion.

## Prepare for Integrity

Students are expected to act with academic integrity.

- Students are required to complete the Academic Integrity Tutorial to understand the fundamental values of academic integrity and how to be a responsible scholar and member of the USask community (tutorial link: <https://libguides.usask.ca/AcademicIntegrityTutorial>) .



- Students can access campus resources that support development of study skills, time and stress management, and ethical writing practices important for maintaining academic integrity and avoiding academic misconduct.

## Responses to Misconduct

Students are expected to be familiar with the academic misconduct regulations (<https://governance.usask.ca/student-conduct-appeals/academic-misconduct.php#About>).

- Definitions appear in Section II of the academic misconduct regulations.
- The academic misconduct regulations apply regardless of type of assessment or presence of supervision during assessment completion.
- Students are advised to ask for clarification as to the specific expectations and rules for assessments in all of their courses.
- Students are urged to avoid any behaviour that could result in suspicions of cheating, plagiarism, misrepresentation of facts. Students should note that posting copyrighted course materials (e.g., notes, questions, assignments or exams) to third party websites or services or other forum or media without permission is an academic or non-academic misconduct offense.

Non-academic offenses are dealt with under the [Standard of Student Conduct in NonAcademic Matters and Regulations and Procedures for Resolution of Complaints and Appeals](#).

## Examinations with Access and Equity Services (AES)

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. In order to access AES programs and supports, students must follow AES policy and procedures. For more information or advice, visit <https://students.usask.ca/health/centres/access-equity-services.php>, or contact AES at 306-966-7273 or [aes@usask.ca](mailto: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.

For information on AES services for Fall 2022 please visit:

<https://students.usask.ca/health/centres/access-equity-services.php#Fall2021Information>

## Student Supports

### Academic Help for Students

The University Library offers a range of learning and academic support to assist USask undergrad and graduate students. For information on specific services, please see the Learning page on the Library web site <https://library.usask.ca/support/learning.php>.

Remote learning support information <https://students.usask.ca/remote-learning/index.php>

Class and study tips <https://students.usask.ca/remote-learning/class-and-study-tips.php>

Remote learning tutorial [https://libguides.usask.ca/remote\\_learning](https://libguides.usask.ca/remote_learning)

Study skills materials for online learning <https://libguides.usask.ca/studyskills>

A guide on netiquette, principles to guide respectful online learning interactions  
<https://teaching.usask.ca/remote-teaching/netiquette.php>

### **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' web site <http://students.usask.ca>.

### **Financial Support**

Any student who faces 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>).

### **Aboriginal Students' Centre**

The Aboriginal Students' Centre (ASC) is dedicated to supporting Aboriginal 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 also dedicated to intercultural education, bringing Aboriginal and non-Aboriginal students together to learn from, with and about one another in a respectful, inclusive and safe environment. Students are encouraged to visit the ASC's Facebook page (<https://www.facebook.com/aboriginalstudentscentre/>) to learn more.

### **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. Please visit [students.usask.ca](https://students.usask.ca) for more information.

### **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: <https://artsandscience.usask.ca/undergraduate/advising/>