



# UNIVERSITY OF SASKATCHEWAN

Department of Biology

## COURSE SYLLABUS

<b>COURSE TITLE:</b>	<b>BIOL 365 – Insect Diversity and Evolution</b>		
<b>COURSE CODE:</b>	80019	<b>TERM:</b>	Fall 2021
<b>COURSE CREDITS:</b>	3.0	<b>DELIVERY:</b>	Lecture & Practicum (Lab)
<b>CLASS SECTION:</b>	01	<b>START DATE:</b>	3 September 2021
<b>CLASS LOCATION:</b>	Rm. 265, Geological Sci Building	<b>LAB LOCATION:</b>	Rm. G11, Thorvaldson Building
<b>CLASS TIME:</b>	MWF 10:30 to 11:20 am	<b>LAB TIME:</b>	Wed 1:30 to 5:20 pm
<b>COURSE WEBSITE:</b>	via Canvas		

### Course Description

Surveys insects and their close relatives based on morphology and taxonomy. Focuses on insect natural history, comparative structure and classification, with some aspects of economic importance. Specimens examined in the laboratory provide opportunities for familiarization and identification, leading to an enhanced understanding of current trends in insect taxonomy and phylogeny.

### Prerequisites

BIOL 120.3 and 121.3, plus 3 additional credit units of senior BIOL courses; or permission of the instructor.

### Land Acknowledgement

As we gather here during this course, 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.

### Instructors

#### Lecturers:

(Course Coordinator)

Prof. A.R. Davis

CSRB Room 320.6

(306) 966-4484

[art.davis@usask.ca](mailto:art.davis@usask.ca)

Dr. D.H. Smith

Thorvaldson Room G11L

(306) 966-4415

[dh.smith@usask.ca](mailto:dh.smith@usask.ca)

#### Lab Coordinator:

Dr. D.H. Smith

Thorvaldson Room G11L

#### Office Hours for Dr. Davis:

Mondays 11:30am – 12:30pm (or by appointment)

## **Learning and Teaching Context**

As the instructors, we recognize that this course is occurring during a time of transition and that for most of this course's participants, it has been several months since attending the University of Saskatchewan campus in person, for learning purposes. These past 18 months have been extremely challenging, with trauma and loss experienced by many in our university community and beyond. Transitioning out of the pandemic is another change that may prove difficult. Accordingly, we ask that all course participants interact with empathy and care. The following set of guidelines is important in order to assist everyone through the term safely.

## **Important Guidelines for this Transition Term**

During this transition, it is important that we safely undertake the in-person elements of this course. In order to do so, the university has developed a set of expectations and safety protocols that all students must adhere to, if they are to engage in these in-person activities.

### **Throughout the term:**

- **Protect the pack:** Right now, the impact of student choices and activities when not on campus cannot be separated from time spent on campus. In order to “protect the pack”, the university is asking all students who are doing in-person work to be mindful and do whatever possible to lower the risk that COVID-19 will be contracted and brought onto campus.
- **Know what is required and expected of you:** One of the critical lessons learned in dealing with COVID-19 is knowing that situations can change and we must be flexible and ready to adjust our safety protocols. Instead of listing all of the relevant information here in the syllabus, the university has created a webpage ( [Student Safe Return to Campus page](#) ) where all up-to-date information around returning to campus is listed (including indoor masking requirements, vaccine mandate, maintaining physical distancing, regular hand-washing, health monitoring, and reporting of positive and suspected cases of Covid-19). **You are responsible for regularly checking the health and safety guidelines** throughout the fall term at <https://covid19.usask.ca/about/safety.php#Expectations> and knowing what is expected of you.
- **Follow all guidance:** Students are expected to follow all guidance provided by the University's Pandemic Recovery/Response Team (PRT), College/Department, professors, lab instructors, TAs, and any other staff member involved in the in-person academic program activities (e.g., Protective Services, Safety Resources).
- **Key channels of communication:** If there is a need for the class to pause meeting in-person for a block of time, you will be notified through your NSID, using Canvas. In this event, you will be provided with detailed information about what you will need to do in place of the in-person class sessions (e.g., read content posted in Canvas).

## **Learning Outcomes**

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

1. Be familiar with the insect diversity of Saskatchewan and western Canada, in general.
2. Be able to confidently recognize and assign insects to their proper taxonomic order, and have developed proficiency to identify insects to family (or lower) level using appropriate taxonomic keys.
3. Have acquired the skills necessary for the capture, preservation, identification, and presentation of insects into an organized collection.
4. Learn to work efficiently both as individuals and within group settings.

**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>

## **Course Overview**

This course consists of three lectures of 50 minutes per week, plus a weekly lab session on Wednesday afternoons from September 8<sup>th</sup> to December 1<sup>st</sup>, 2021. Weather permitting, the first 1-2 lab sessions in September will be afternoon field trips (local, or possibly extended) to provide students with an opportunity to augment their insect collections. Thereafter, much of each lab session will be spent as individuals or in small groups, keying out the student-collected insects that will be submitted by each student (minimum of 50 insect families per student collection).

## **Tentative Lecture Schedule**

<b>Week #</b>	<b>Instructor</b>	<b>Dates</b>	<b>Lecture Topics</b>
1-3	Davis	Sept. 3–13 (4 lectures)	Introduction and Course objectives; General body plan of an adult insect; The three body regions (head, thorax, abdomen) and their significant parts; Stages of an insect's life cycle; Metamorphosis – simple (ametabolous, hemimetabolous, paurometabolous) versus complete (holometabolous); Types of larvae and pupae; Life-cycle strategies – oviparity and some variations (viviparity, polyembryony, parthenogenesis) of insect reproduction; Regulation of moulting during growth of immatures to adults. <b>[ Monday, September 6 – Labour Day Holiday ]</b>
3-5	Smith	Sept. 15–27 (6 lectures)	Evolutionary relationships: Arthropod and Insect Classification; Insecta and non-insect relatives. Geological history and insect evolution. Hexapod relationships and Near Insects (Collembola, Diplura, Protura). Apterygota – Orders Zygentoma, Microcoryphia; Evolution of Wings; Introduction to Pterygota and Paleoptera – Orders Ephemeroptera, Odonata; An aquatic orthopteroid order – Plecoptera.
5-7	Davis	Sept. 29–Oct. 13 (6 lectures)	Introduction to Polyneoptera: Remaining Orthopteroid orders – Orthoptera, Phasmatodea, Mantodea, Mantophasmatodea, Grylloblattodea, Dermaptera, Blattodea, Isoptera (including introduction to insect sociality), Zoraptera, Embioptera. <b>[ Monday, October 11 – Thanksgiving Day Holiday ]</b>
7-9	Davis	Oct. 15–25 (5 lectures)	Introduction to Paraneoptera – Hemipteroid orders: Hemiptera (including disease transmission to plants, animals), Psocoptera, Phthiraptera, Thysanoptera.
<b>LECTURE MID-TERM EXAM – Wednesday, October 20, 2021 (1:30 – 3:00pm; Room TBA)</b>			
9-12	Davis	Oct. 27–Nov. 15 (6 lectures)	Introduction to Oligoneoptera – Mecopteroid orders: Mecoptera, Lepidoptera (including silk production, role in pollination), Diptera (including importance of biting flies; degradation of organic matter), Siphonaptera.
<b>[ Term 1 Study Break – Monday, November 8 to Friday, November 12, including Thursday, November 11 – Remembrance Day Holiday ]</b>			
12-13	Smith	Nov. 17–22 (3 lectures)	Remaining Mecopteroid order – Trichoptera; Neuropteroid orders – Neuroptera, Megaloptera, Raphidioptera.

13-14 Davis Nov. 24–Dec. 1 (4 lectures) Remaining Neuropteroid orders – Coleoptera, Strepsiptera.

14-15 Davis Dec. 3–6 (2 lectures) Hymenopteroid Order – Hymenoptera (including importance in biological control; role of bees in pollination, honey production; ants and seed dispersal); Brief review and discussion of format of Final Exam.

## Lab Schedule

<u>Date</u>	<u>Topic and Details</u>
Sept. 8	Local field trip on U of S campus.
Sept. 15	Possibly an extended field trip to an aquatic site (e.g., Eagle Creek, SK).
Sept. 22–Dec. 1	Further details about the lab schedule and the preparation of your insect collection will be provided in the laboratory sessions of this course, which take place on Wednesdays from 1:30-5:20pm in Thorvaldson Rm G11.
Nov. 24	<b>Laboratory Exam.</b> Room location to be announced later in the term.

## Course Resources

### Textbooks

There is one required textbook which contains the dichotomous keys necessary to identify your collected insects to family level. This text is available from the U of S Bookstore:

Borror and DeLong's Introduction to the Study of Insects (2004) 7<sup>th</sup> Edition (Thomson)  
by C.A. Triplehorn and N.F. Johnson

*Additional texts* have been placed on reserve, and are available in the Sciences Library:

Introduction to Insect Biology and Diversity (1998) 2<sup>nd</sup> Edition (Oxford) QL 463.D34 1998  
by H.V. Daly, J.T. Doyen and A.H. Purcell

Entomology (2005) 3<sup>rd</sup> Edition (Springer) QL 463.G54 2005  
by C. Gillott

Insects – Their Natural History and Diversity (2006) QL 473.M34 2006  
by S.A. Marshall

## Supplementary Resources

From time to time, your instructors may make supplementary material available to you on Canvas, the University of Saskatchewan's learning platform. This material will not replace the lecture or lab experience; you are strongly encouraged to attend all lectures as well as to take your own notes.

## Grading Scheme

Lecture Midterm Exam	20%
Lecture Final Exam	40%
Laboratory Exam	10%
Student Collection of Insects	30%
Total	100%

## Evaluation of Student Performance

### Lecture Midterm Exam

- Value:** 20% of final course grade.
- Date:** During the first part (1:30 – 3:00pm) of the lab slot on **Wednesday, October 20, 2021**.
- Duration:** 90 minutes (1.5 hrs); Room TBA.
- Format:** Combination of short answers and paragraph-style answers.
- Description:** Students are responsible for all lecture material up to the end of the Polyneoptera orders, from September 3 – approx. October 13, 2021.  
[This exam must be completed by students, individually.](#) Note that no phones, laptops, or other electronic devices, nor written materials, are allowed to be consulted during the exam.

### Lecture Final Exam

- Value:** 40% of final course grade.
- Date:** Consult the Final Exam Schedule (**December 8-23, 2021**), arranged by the Examinations Division. Students must avoid making prior travel, employment, or other commitments for this period. Students are encouraged to review all University examination policies and procedures:  
<https://policies.usask.ca/policies/academic-affairs/academic-courses.php#7Examinations>
- Duration:** 180 minutes (3 hrs).
- Format:** Combination of short answers and paragraph-style answers.
- Description:** This exam is comprehensive in that it will cover all lecture material. However, material delivered since the Midterm Exam will be emphasized. [This exam must be completed by students, individually.](#) Note that no phones, laptops, or other electronic devices, nor written materials, are allowed to be consulted during the exam.

### Laboratory Exam

- Value:** 10% of final course grade.
- Date:** During the laboratory period (**1:30 – 5:20pm**) on **Wednesday, November 24, 2021**.
- Duration:** If required, the entire lab period (4 hrs) on November 24<sup>th</sup> is available. Room location TBA.
- Format:** This exam will consist of a selection of unidentified (about 8-12, mostly pinned) insects, which the student will attempt to key correctly to family level. Students will be evaluated according to the accuracy of their identifications of these unknowns.
- Description:** [Each student will work independently to key out the unidentified insects presented.](#) Note that in order to complete this exam, the course textbook is required by the student because s/he must record the path of the various couplets followed, to arrive at the selected family per exam specimen.

### Student Collection of Insects

- Value:** 30% of final course grade.
- Date/Time:** Deadline for submission to Dr. D. Smith is **Wednesday, December 1, 2021 by 4:00 p.m.**
- NOTE:** The time required to mark each collection of insects is relatively high, and this course has a large enrolment. For these reasons, in order to have final course grades submitted in a timely manner, it is not possible to grant an extension to this deadline. **Insect collections submitted after the deadline indicated above, will not be graded.** Thus, ensure that you submit your insect collection (even if not entirely completed) to Dr. Smith by the deadline date/time shown above.
- Format:** [Each student must independently prepare and submit an insect collection,](#) with the goal to correctly identify a minimum of 50 insect families according to the established family names specified in the course's required textbook. The student will be evaluated on the basis of the accuracy of family identifications made, plus the quality of the preservation and presentation of the insects in one's collection, as well as the collection's overall organization.

**Description:** The student's collection of insects is the largest single laboratory assignment for this course, and hence requires a comprehensive effort by each student in terms of collection, preservation, identification, and presentation. Accordingly, most of each weekly lab session is devoted to students' identification of their insects collected. Students work at their own pace. Note that in some instances, it may become necessary for a student to continue to work on her/his insect collection outside of regularly-scheduled lab sessions. Please consult the Lab Coordinator if you need to make such arrangements for accessing your insect collection and/or lab space, beyond the regularly-scheduled labs.

### **Literal Descriptors for Grading**

Information on the literal descriptors for the University of Saskatchewan's grading system can be found at: <http://students.usask.ca/academics/grading/grading-system.php>, and is summarized on the final page.

### **Criteria That Must Be Met to Pass**

The Lecture Final Exam and the Student Collection of Insects are **mandatory** evaluative elements of this course, and therefore must be completed and submitted by each student, in order to be eligible to pass this course.

### **Attendance Expectations**

Students are expected to attend lectures regularly throughout the term and are responsible to obtain any missed notes from a classmate.

Identification of the specimens in one's insect collection to family level is not as difficult compared to genus or even species levels. However, it still requires dedication to learn the particular body structures and their patterns within one's diverse specimens, as well as the manual operation of the textbook's dichotomous keys for the various orders of insects. For that reason, following the first 1-2 lab periods involving class trips for insect collection, each lab period throughout the entire term is a vital opportunity to continue progressing toward completion of one's collection for eventual submission. Weekly dedication to this task during labs will help reduce the need, or time required, for working on specimen identification outside of lab times.

If you are unable to attend classes and the scheduled lab in person, for a period exceeding one week, please contact the Course Coordinator by email to make him aware.

### **Absence at Examinations**

Students absent from the Midterm Examination or the Laboratory Examination must contact the Course Coordinator, *in person or by telephone, within three (3) working days of the date of the scheduled exam*, in order to explain their absence and to initiate discussion concerning a possible deferred examination. Otherwise, a grade of zero will be assigned for the missed examination.

Students absent from the Final Examination in December, 2021 must contact the College in which they are enrolled, to apply for permission to write a Deferred Final Exam. If granted, an exam will be arranged to be written in mid-February, 2022.

### **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 encouraged 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](#).

## Copyright

Course materials are provided to you based on your registration in a class, and anything created by your professors and instructors is their intellectual property and cannot be shared without written permission. This copyrighted material includes exams, PowerPoint/PDF slides, and any 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>). If materials are designated as open education resources (with a creative commons license), you can share and/or use those materials in alignment with the [CC license](#).

**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.

## Recording of the Course's Classes

For this in-person course, the instructors will not be recording their classes. Also, students are prohibited from recording this course's lectures. If a special circumstance arises during the term, this policy may be revisited.

## 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 AES at a different venue.

For information on AES services for Fall 2021 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 are also encouraged to seek support from their College office:

#### **Arts & Science Undergraduate Student Office**

Room 265, Arts Building  
(306) 966-4231  
[student-advice@artsandscience.usask.ca](mailto:student-advice@artsandscience.usask.ca)

#### **Agriculture & Bioresources Undergraduate Student Office**

Room 2D30, Agriculture Building  
(306) 966-4056  
[agbio.studentservices@usask.ca](mailto:agbio.studentservices@usask.ca)

### **Student Feedback**

Students will be given a formal opportunity to provide constructive feedback about this course's instruction and delivery near the end of the term.

## University of Saskatchewan Grading System (for undergraduate courses)

**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