

COURSE SYLLABUS

COURSE TITLE:	BIOL 365 – Insect Diversity and Evolution		
COURSE CODE:	80019	TERM:	Fall 2019
COURSE CREDITS:	3.0	DELIVERY:	Lecture & Practicum (Lab)
CLASS SECTION:	01	START DATE:	4 September 2019
CLASS LOCATION:	Rm. 124 Biology Building	LAB LOCATION:	Rm. 213 Biology Building
CLASS TIME:	MWF 9:30 to 10:20 am	LAB TIME:	Wed 1:30 to 5:20 pm
WEBSITE:	via Course Tools (Blackboard)		

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. Representative types examined in the laboratory provide an 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.

Learning Outcomes

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

1. Be familiar with the insect diversity of western Canada, especially Saskatchewan.
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 in 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 4 to December 4, 2019. 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). So that students gain an even wider familiarity with insect diversity, specimens from the permanent Department of Biology insect collection will also be introduced during the labs on a regular basis.

Instructors

Lecturers:

(Course Coordinator)

Prof. A.R. Davis
CSRB Room 320.6
(306) 966-4484

art.davis@usask.ca

Dr. D.H. Smith
Biology Room 118.1
(306) 966-4415

dh.smith@usask.ca

Lab Coordinator:

Dr. D.H. Smith
Biology Room 118.1

Office Hours:

Mondays 10:45am – Noon

Tentative Lecture Schedule

Week # Lecturer Dates

1-2 Davis Sept. 4–11 (4 lectures) Introduction and Course objectives; Why study insects? 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.

2-4 Smith Sept. 13–25 (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.

4-6 Davis Sept. 27–Oct. 9 (6 lectures) Introduction to Polyneoptera: Remaining Orthopteroid orders – Orthoptera, Phasmatodea, Mantodea, Mantophasmatodea, Grylloblattodea, Dermaptera, Blattodea, Isoptera (including introduction to insect sociality), Zoraptera, Embioptera.

[Monday, October 14 – Thanksgiving Day Holiday]

LECTURE MID-TERM EXAM – Wednesday, October 16, 2019 (1:30 – 3:00pm; Rm 204 & 212)

- 6-8 Davis Oct. 11–23 (5 lectures) Introduction to Paraneoptera – Hemipteroid orders: Hemiptera (including disease transmission to plants, animals), Psocoptera, Phthiraptera, Thysanoptera.
- 8-10 Davis Oct. 25–Nov. 6 (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.
- 10-12 Smith Nov. 8–20 (3 lectures) Remaining Mecopteroid order–Trichoptera; Neuropteroid orders – Neuroptera, Megaloptera, Raphidioptera.

[Term 1 Study Break - Monday, Nov. 11 (Remembrance Day Holiday) to Friday, Nov. 15]

- 12-13 Davis Nov. 22–29 (4 lectures) Remaining Neuropteroid orders – Coleoptera, Strepsiptera.
- 14 Davis Dec. 2–4 (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.

Tentative Lab Schedule

<u>Date</u>	<u>Topic and Details</u>
Sept. 4	Local field trip on U of S campus.
Sept. 11	Possibly an extended field trip to an aquatic site (e.g., Eagle Creek, SK).
Sept. 18 – Dec. 4	Further details about the laboratory 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 Biology Rm 213.
Nov. 27	Laboratory Exam. 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) 7th Edition (Thomson)
by C.A. Triplehorn and N.F. Johnson

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

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

Entomology (2005) 3rd 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 Blackboard, which you can access using Course Tools. This material will not replace the lecture or lab experience; you are strongly encouraged to attend all lectures and 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 16, 2019.**

Duration: 90 minutes (1.5 hrs), held in Biology Rms 212 and 213.

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 4 – approx. October 11, 2019.

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 7-23, 2019**), arranged by the Registrar. 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. 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 27, 2019.**

Duration: If required, the entire lab period (4 hrs) on November 27th 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 strictly 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 4, 2019 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 the collection, plus 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.

Students Writing 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. In order to access AES programs and supports, students must follow AES policy and procedures. For more information, check www.students.usask.ca/aes or contact AES at 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 AES-stated deadlines. Instructors shall provide the examinations for students who are being accommodated by AES, by the deadlines established by AES.

Absence at Examinations

Students absent from the Midterm or 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. Such students must also provide the Course Coordinator with the necessary documentation explaining the student's absence at the examination. Otherwise, a grade of zero will be assigned for the missed examination.

Students absent from the Final Examination in December, 2019 must contact the College in which they are enrolled, to apply for permission to write a Deferred Final Exam. Such an exam, if granted, will be arranged to be written in mid-February, 2020.

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.

It is a course requirement that all students read and be familiar with the Regulations on Student Academic Misconduct as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals:

<http://www.usask.ca/secretariat/student-conduct-appeals/academic-misconduct.php> and
<http://www.usask.ca/secretariat/student-conduct-appeals/non-academic-misconduct.php>

Criteria That Must Be Met to Pass

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

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