ANSC*6050 Biometry in Animal Science  
Course Outline: Winter 2018

General Information

Course Description:  
Biometry (or biostatistics) refers to the statistical methods applied to biological sciences. Biological measurements are variable, not only because of measurement error, but also because of the natural variability from genetic and environmental sources – a characteristic which distinguishes biometry within the field of statistics. These sources of variability must be taken into account when making inferences about biological material. “Biometry in Animal Science” is a graduate course for students and researchers of the animal sciences. The primary goal of this course is to give students a deeper understanding of appropriate experimental designs and statistical methods commonly used in animal science. Students will be introduced to a number of statistical procedures, and will learn how to apply them to data from laboratory and field experiments using appropriate software. Emphasis will be placed on statistical concepts and principles, design of experiments, error control, testing of hypotheses, and communication of findings to other scientists, as well as data management.

Credit Weight: 0.50  
Academic Department (or campus): Department of Animal Biosciences  
Campus: Guelph  
Semester Offering: Winter semester 2018  
Class Schedule and Location: Lectures: Mondays & Wednesdays 10:00 - 11:20 in ANNU 030; Labs: Tuesdays (ANNU 102) or Thursdays (ANNU 110) 14:30 - 16:20

Instructor Information

Instructor Name: Dr. Christine Baes  
Instructor Email: cbaes@uoguelph.ca (please include “ANSC*6050” in subject line)  
Office location and office hours: By appointment

Instructor Name: Dr. Michelle Edwards  
Instructor Email: edwardsm@uoguelph.ca (please include “ANSC*6050” in subject line)  
Instructor office location and office hours: By appointment

Instructor Name: Dr. Allison Fleming  
Instructor Email: fleminga@uoguelph.ca (please include “ANSC*6050” in subject line)  
Instructor office location and office hours: By appointment
Course Content

Specific Learning Outcomes:
This course is designed to contribute to your achievement in three of the five university-wide learning outcomes: Critical and creative thinking, Literacy, and Communication. The lab assignments will enhance your understanding and application of the course material.

By the end of the course the student should be able to:
• Present and summarize data using statistical software
• Understand and apply classical inference using confidence intervals and hypothesis testing
• Explain and apply methods to compare treatments
• Apply and interpret variance partition models
• Perform analyses using statistical software and interpret the output
• Recognize and apply various experimental designs
• Demonstrate the ability to convey statistical results to other researchers

Lecture Content:
The following is an approximate schedule of lecture topics:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Weekday</th>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday</td>
<td>Jan. 8</td>
<td>10:00</td>
<td>Presenting and Summarizing Data; Probability</td>
</tr>
<tr>
<td>2</td>
<td>Wednesday</td>
<td>Jan. 10</td>
<td>10:00</td>
<td>Random Variables and their Distributions: Discrete Random Variables</td>
</tr>
<tr>
<td>3</td>
<td>Monday</td>
<td>Jan. 15</td>
<td>10:00</td>
<td>Random Variables and their Distributions: Continuous Random Variables</td>
</tr>
<tr>
<td>4</td>
<td>Wednesday</td>
<td>Jan. 17</td>
<td>10:00</td>
<td>Population and Sample; Estimation of Parameters</td>
</tr>
<tr>
<td>5</td>
<td>Monday</td>
<td>Jan. 22</td>
<td>10:00</td>
<td>Hypothesis Testing (Part 1)</td>
</tr>
<tr>
<td>6</td>
<td>Wednesday</td>
<td>Jan. 24</td>
<td>10:00</td>
<td>Hypothesis Testing (Part 2)</td>
</tr>
<tr>
<td>7</td>
<td>Monday</td>
<td>Jan. 29</td>
<td>10:00</td>
<td>Simple Linear Regression (Part 1)</td>
</tr>
<tr>
<td>8</td>
<td>Wednesday</td>
<td>Jan. 31</td>
<td>10:00</td>
<td>Simple Linear Regression (Part 2)</td>
</tr>
<tr>
<td>9</td>
<td>Monday</td>
<td>Feb. 5</td>
<td>10:00</td>
<td>Correlation</td>
</tr>
<tr>
<td>10</td>
<td>Wednesday</td>
<td>Feb. 7</td>
<td>10:00</td>
<td>Multiple Linear Regression</td>
</tr>
<tr>
<td>11</td>
<td>Monday</td>
<td>Feb. 12</td>
<td>10:00</td>
<td>One-Way Analysis of Variance (Part 1)</td>
</tr>
<tr>
<td>12</td>
<td>Wednesday</td>
<td>Feb. 14</td>
<td>10:00</td>
<td>One-Way Analysis of Variance (Part 2)                       (Reading week)</td>
</tr>
<tr>
<td>13</td>
<td>Monday</td>
<td>Feb. 26</td>
<td>10:00</td>
<td>One-Way Analysis of Variance (Part 3)</td>
</tr>
<tr>
<td>14</td>
<td>Wednesday</td>
<td>Feb. 28</td>
<td>10:00</td>
<td>Concepts of Experimental Design</td>
</tr>
<tr>
<td>15</td>
<td>Monday</td>
<td>Mar. 5</td>
<td>10:00</td>
<td>Blocking</td>
</tr>
<tr>
<td>16</td>
<td>Wednesday</td>
<td>Mar. 7</td>
<td>10:00</td>
<td>Change-Over Designs</td>
</tr>
<tr>
<td>17</td>
<td>Monday</td>
<td>Mar. 12</td>
<td>10:00</td>
<td>Factorial Experiments</td>
</tr>
<tr>
<td>18</td>
<td>Wednesday</td>
<td>Mar. 14</td>
<td>10:00</td>
<td>Heirarchical / Nested Designs</td>
</tr>
</tbody>
</table>
Lab Content:
Students are expected to bring their own laptop computer. The following is a schedule of labs:

<table>
<thead>
<tr>
<th>Lab</th>
<th>Weekday</th>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tues/Thurs</td>
<td>Jan. 9/11</td>
<td>14:30</td>
<td>Lab 1</td>
</tr>
<tr>
<td>2</td>
<td>Tues/Thurs</td>
<td>Jan. 16/18</td>
<td>14:30</td>
<td>Lab 1 due, Lab 2</td>
</tr>
<tr>
<td>3</td>
<td>Tues/Thurs</td>
<td>Jan. 23/15</td>
<td>14:30</td>
<td>Lab 2</td>
</tr>
<tr>
<td>4</td>
<td>Tues/Thurs</td>
<td>Jan. 30/Feb. 1</td>
<td>14:30</td>
<td>Lab 2 due, Lab 3</td>
</tr>
<tr>
<td>5</td>
<td>Tues/Thurs</td>
<td>Feb. 6/8</td>
<td>14:30</td>
<td>Discussion/Reading Assignment</td>
</tr>
<tr>
<td>6</td>
<td>Tues/Thurs</td>
<td>Feb. 13/15</td>
<td>14:30</td>
<td>Lab 3 due, Lab 4</td>
</tr>
<tr>
<td>7</td>
<td>Tues/Thurs</td>
<td>Feb. 27/29</td>
<td>14:30</td>
<td>Discussion/Reading Assignment</td>
</tr>
<tr>
<td>8</td>
<td>Tues/Thurs</td>
<td>Mar. 6/8</td>
<td>14:30</td>
<td>Lab 4 due, Lab 5</td>
</tr>
<tr>
<td>9</td>
<td>Tues/Thurs</td>
<td>Mar. 13/15</td>
<td>14:30</td>
<td>Discussion/Reading Assignment</td>
</tr>
<tr>
<td>10</td>
<td>Tues/Thurs</td>
<td>Mar. 20/22</td>
<td>14:30</td>
<td>Lab 5 due, Final Project</td>
</tr>
<tr>
<td>11</td>
<td>Tues/Thurs</td>
<td>Mar. 27/29</td>
<td>14:30</td>
<td>Question period (Final Project)</td>
</tr>
<tr>
<td>12</td>
<td>Tues/Thurs</td>
<td>Apr. 3/5</td>
<td>14:30</td>
<td>Final Project due</td>
</tr>
</tbody>
</table>

Course Assignments and Tests:

<table>
<thead>
<tr>
<th>Assignment or Test</th>
<th>Contribution to Final Mark (%)</th>
<th>Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Assignments</td>
<td>60</td>
<td>1-9</td>
</tr>
<tr>
<td></td>
<td><strong>Computational Assignments:</strong> 45</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Reading / Critiques:</strong>       15</td>
<td></td>
</tr>
<tr>
<td>Final Project</td>
<td>40</td>
<td>1-9</td>
</tr>
</tbody>
</table>

Lab Assignments:
- Lab assignments contribute 60% to the final grade and are composed of both computational assignments and reading / literature critique assignments.
- Assignments will be posted on CourseLink and discussed during labs. I expect students to make full use of lab time to learn methods and techniques needed in the assignments.
- You will have two weeks to work on the assignments (except for Lab 1, for which you will have one week) and hand them in during the next lab. **Late assignments will be penalized**
with a grade reduction of 30% per day.

- Marked assignments will be returned during labs. Solutions will be discussed during labs and grades will be posted on CourseLink.
- It is in your best interest to do all assignments, as they reinforce concepts introduced in class.
- If you miss more than one assignment for a valid reason your mark will be re-weighted on the basis of those that were handed in. Otherwise, missed assignments will receive a grade of 0.

Final Project:
- The final project is worth 40% of your final grade.
- The project will incorporate both lab and lecture material.

Course Resources

Communication:
All communication outside of class will be through CourseLink.
- News: important messages regarding the course will be posted in the News section on CourseLink. Please check this regularly.
- Discussion: Please use the Discussion option on CourseLink to ask question and discuss course content and assignments with the entire class. Drs Baes, Edwards and Fleming will monitor the online Discussion and answer questions there.
- Any emailed questions related to the course content will be copied to the CourseLink Discussion and answered there for the benefit of all students.
- Email: Please email Drs Baes, Edwards or Fleming for personal communications, such as scheduling an appointment or other personal concerns. Please include “ANSC*6050” (no space) in subject line

Other Resources:
Notes, lecture slides, assignments, data sets, programming scripts, etc. will be posted on CourseLink. Most of the assignments will require the use of statistical software. Please see the Links section for additional materials. Students are advised to take their own notes during lectures.

Course Policies

Grading Policies:
- You will have two weeks to work on the assignments (except for Lab 1, for which you will have one week) and hand them in during the next lab.
- Late assignments will be penalized by a grade reduction of 30% per day.
- Marked assignments will be returned during labs. Solutions will be discussed during labs and grades will be posted on CourseLink.
- It is in your best interest to do all assignments, as they reinforce concepts introduced in
class.
• If you miss more than one assignment for a valid reason your mark will be re-weighted on
  the basis of those that were handed in. Otherwise, missed assignments will receive a grade
  of 0.

Course Policy on Group Work:
While you are encouraged to discuss the assignment problems with fellow students, each
student must hand in an individual solution that is the result of his/her own efforts.

Course Policy regarding use of electronic devices and recording of lectures:
Electronic recording of lectures or labs is not permitted.

University Policies

Academic Consideration:
The University of Guelph is committed to supporting students in their learning experiences and
responding to their individual needs and is aware that a variety of situations or events beyond
the student's control may affect academic performance. Support is provided to accommodate
academic needs in the face of personal difficulties or unforeseen events in the form of
Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions,
including categories, grounds, timelines and appeals can be found in Section VIII
(Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

Academic Misconduct:
The University of Guelph is committed to upholding the highest standards of academic integrity
and it is the responsibility of all members of the University community, faculty, staff, and
students to be aware of what constitutes academic misconduct and to do as much as possible
to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on
academic misconduct regardless of their location of study; faculty, staff and students have the
responsibility of supporting an environment that discourages misconduct. Students need to
remain aware that instructors have access to and the right to use electronic and other means of
detection. Please note: Whether or not a student intended to commit academic misconduct is
not relevant for a finding of guilt. Hurried or careless submission of assignments does not
excuse students from responsibility for verifying the academic integrity of their work before
submitting it. Students who are in any doubt as to whether an action on their part could be
construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in Section VIII
(Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.
Accessibility:
The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the Student Accessibility Services website (http://www.uoguelph.ca/csd/).

Course Evaluation Information:
End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the Course and Instructor Evaluation Website for more information.

Drop period:
The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in Section III (Schedule of Dates) of the Undergraduate Calendar.

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.