Introduction to Applied Statistics
Stat 151 (AS02)

Winter 2021

Instructor: Dr. Karen Buro

E-mail: burok@macewan.ca (the best and fastest way to contact me)
I will try to respond to your email within 24 hours. However, do not expect me to respond to your emergency after 8 PM.

Website: https://academic.macewan.ca/burok/Stat151/index.html
https://learn.macewan.ca/ (Blackboard)

Office Hours: Wednesday 11 AM or by appointment (in our Blackboard classroom)

Lecture Time: Tuesday, Thursday 11 AM – 12:20 PM
On Blackboard

Availability of Recordings of Online Lectures: Instructional contents of live lectures will be recorded and videos will be posted on Blackboard after class until the end of the term.

Course Credits: 3
Course Hours: **Lecture** 45   **Lab** 18

Course Description: In this course the following topics are covered: data collection and presentation; descriptive statistics; probability distributions, sampling distributions and the central limit theorem; point estimation, confidence intervals, and hypothesis testing; one-way ANOVA; Chi-square tests; and correlation and regression analysis. Applications are taken from a broad variety of fields such as biological and medical sciences, engineering, social sciences and economics.
Note: This course may not be taken for credit if credit has been obtained in Stat 161.

Learning Outcomes: Upon completion of this course, students will be able to:
- Choose the appropriate tools for describing different types of data
- Solve elementary problems in probability theory
- Explain the purpose of statistical inference
- Choose the appropriate statistical tool in elementary statistical inference
- Analyze data using exploratory and inferential statistical methods

Course Prerequisite(s): Mathematics 30-1 or Mathematics 30-2 or successful completion of the statistics gateway exam

Required Learning Materials:

1. Textbook: Introductory Statistics, 10th Edition, by Neil A. Weiss, published by Pearson. The textbook is **optional**, and any edition works.
2. This course consists of one welcome module and thirteen learning modules. Course notes on all modules are available on Blackboard Learn.
3. Laboratory Manual: Introduction to Applied Statistics (in R). The lab manual is available on Blackboard Learn.

Other Learning Resources: Non-programmable scientific calculator

Evaluation:

Term Examination(s)	25%
Final Examination*	30%
Homework Assignments	20%
Lab Quizzes	15%
Lab Final Examination	10%
	100%

Examination Dates:
Term examination: 11 – 12:20 PM, Thursday, February 25, 2021
Final Examination*: 9 – 12 AM, Friday, April 15, 2021
*Students are responsible for verifying the date of the final exam in MyStudentSystem.

The term and final examinations will be held online. Information and instructions about the format, date, and processes for your final exam are posted within your course located in Blackboard Learn.

Further information and instructions on the exam booking process is located within your course located in Blackboard Learn under the Exam Services link.

Format of Examinations: Further information will be announced later.

Grading:

MacEwan University adheres to the Alberta Common Grading Scheme, which is a 12 point letter grade system. While faculty may use percentages to aid in their grade development, only the letter grade will appear on transcripts.

A+	95-100
A	90-94
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	45-49
F	0-44

Official grades will be provided by the Office of the University Registrar through myStudentSystem. A minimum grade of C– is required to receive transfer credit or to satisfy a prerequisite for a higher level course.

Note: A minimum of 40% is required on the final exam in order to obtain a grade of C- or better in the course.

Homework Assignments: See the weekly schedule for due dates.

There are six homework assignments, roughly one for each two modules. Homework assignment problems and solutions will be posted on the course webpage on Blackboard.
1. Each homework assignment consists of two parts: Part A and Part B. You are required to finish Part A by hand, i.e., you type your answers below each question in a word document, use a calculator to get the numerical answers, and draw a figure by hand then take a picture of it and insert it to the word document. You could also finish Part A with pen and paper, and take photos of all pages and upload the images to Crowdmark. Make sure that you number each page and label each question. You finish Part B using R commander (software you learn in the lab) and insert the computer output below the questions. Part B involves writing answers to questions that use information from computer output.
2. Submit your assignment through Crowdmark (https://app.crowdmark.com/sign-in) by 11:59 PM on the due date. Late assignments are NOT accepted. **Make sure to upload answers to all questions in the specified boxes with correct orientation. This can take some time!**

Labs

1. The computer software used in the Stat 151 labs is the R Commander package in a free professional statistical software R. No prior experience with this software is expected.
2. You must attend the labs that you are registered in. Any changes must be done officially at the office of the registrar.
3. There are five lab quizzes which account for 15% of the final grade. All quizzes must be written in your assigned lab section. If you miss a lab quiz you must provide the instructor with an explanation within 24 hours or a mark of zero may be given. Notification may be provided through email, voice mail, or direct contact with the instructor. If your absence is excused the weight of this missed quiz will be moved to the other lab quizzes. A mark of zero will be given if the instructor considers the excuse inappropriate or inadequately substantiated.
4. Lab Exams will be 90 minutes long and available on Blackboard for 24 hours (from 8 pm Wednesday April 7 to 8 pm Thursday April 8). Students may use course material, R and R Commander, and a calculator. Lab exams may not be deferred.

Your lab instructor oversees your lab and will notify you of any changes within your lab!

Student Responsibilities:

Students should familiarize themselves with the policy on Student Rights and Responsibilities (E3101) and appeals (3103).

(https://www.macewan.ca/wcm/StudentAffairs/AcademicIntegrity/RightsResponsibilities/Students/index.htm).

1. **Academic Integrity**: Students are responsible for understanding the Student Academic Integrity Policy (https://www.macewan.ca/contribute/groups/public/documents/policy/zwdf/cg9s/~edisp/student_acad_integ_policy.pdf) and what constitutes academic misconduct. All incidents of academic misconduct, as outlined in the policy, are reported and recorded by the Academic Integrity Office (https://www.macewan.ca/wcm/StudentAffairs/AcademicIntegrity/index.htm). Information and resources are available on MacEwan's Academic Integrity Website (https://www.macewan.ca/wcm/StudentAffairs/AcademicIntegrity/index.htm).

   MacEwan University's Academic Integrity Policy (https://www.macewan.ca/contribute/groups/public/documents/policy/zwdf/cg9s/~edisp/student_acad_integ_policy.pdf) promotes honesty, fairness, respect, trust, and responsibility in all academic work. The policy defines academic misconduct as the following: "Participating in acts by which a person gains or attempts to gain an unfair academic advantage thereby compromising the integrity of the academic process," including:

   • cheating
   • plagiarism
   • improper collaboration
   • contract cheating (severe misconduct)
   • fabrication and falsification
   • helping, or attempting to help, another student commit academic misconduct
   • obtaining an unfair advantage
   • multiple submissions

2. **Registration Status**: You are responsible for your registration status at the University, such as adding and dropping of courses and confirming that the changes have been made.

3. **Course prerequisites**: Students are responsible for having all prerequisites required for a given course. Students who do not have the appropriate prerequisite may be removed from the course. If removed from the course, the student is responsible for any tuition costs up to the date of removal. Courses from another post-secondary institute cannot be used as a prerequisite until assessed and approved for transfer credit.

4. **Withdrawing From The Course**: If you stop attending class you must complete (https://www.macewan.ca/contribute/groups/public/documents/document/03203_add_drop_notice.pdf), have it signed by an Academic Advisor (Rm 6-211), and submit it to the Office of the University Registrar by the last day to withdraw as provided in the Academic Schedule (https://www.macewan.ca/wcm/Registrar/EnrolmentServices/AcademicSchedule/index.htm). Failure to officially withdraw will result in a grade being assigned based on course work completed. Late withdrawals are only allowed in exceptional circumstances.

5. **Exam**: All exams will be held online. Further information will be announced later on Blackboard.

6. **Missed Term Exams**: If you miss a term examination, you must contact your instructor within 48 hours. Notification may be provided through email, voice mail, or direct contact with the instructor. The weight of a missed examination may be added to the weight of the final examination in the course or an alternative assignment or exam may be assigned at the discretion of the instructor. If the instructor has not been contacted within 48 hours, the recorded mark of the missed examination will be zero.

7. **Final Exams**: Policy [C2005: Final Assessment](https://www.macewan.ca/contribute/groups/public/documents/policy/final_assessment.pdf) (https://www.macewan.ca/contribute/groups/public/documents/policy/final_assessment.pdf) and Policy [C2020: Grading](https://www.macewan.ca/wcm/Registrar/EnrolmentServices/AcademicStandingandGrades/GradesandGPA/index.htm) (https://www.macewan.ca/wcm/Registrar/EnrolmentServices/AcademicStandingandGrades/GradesandGPA/index.htm). Students are responsible for confirming the date, time, duration and location of the final exam. Students unable to attend any scheduled exam for any reason must contact their instructors within two business days.

8. **Deferred Final Exam Process**: For the upcoming exam session, the deferred final exam process will not be used and we are going to treat everything as an Incomplete. Students who contact their instructor and are unable to complete everything (coursework or final exams) in time for the instructor to submit a letter grade by the grade submission deadline (**April 24**) will need to fill out and submit the an incomplete grades form (https://www.macewan.ca/contribute/groups/public/documents/document/03205_incomplete_grades.pdf). If students can't sign it, scan it, and send it electronically, an email from their MacEwan account is sufficient. It then needs to go to the chair for approval.

9. **Late Assignments (including laboratory assignments)**: As due dates for assignments are known well in advance, medical and other excuses are generally not accepted as a reason for submitting late assignments.

10. **Access and Disability Resources**: If you require exam accommodations due to a disability, you are advised to contact and register with MacEwan's Access and Disability Resources well in advance of booking your first exam. To obtain information about Access and Disability Resources services and the process for registering with Access and Disability Resources**,** visit the website: https://www.macewan.ca/wcm/StudentAffairs/AccessandDisabilityResources/index.htm
To make an appointment with one of ADR's professional resource staff, contact the receptionist at ADR as follows:
Telephone: 780-497-5886
Email: myaccess@macewan.ca

11. **Student Appeals**: See Policy E3103: Student Appeals (https://www.macewan.ca/contribute/groups/public/documents/policy/student_appeals.pdf). You should access this policy to become aware of the deadlines and guidelines that need to be followed if you are appealing a grade or other University assessment. Assistance with the appeals process is available through counsellors in the Student Life office. Please call 780 497 5064 to make an appointment.

12. **MyMacEwan.ca Email**: All students are given a *<name>*@mymacewan.ca email address. This email address is available to the course instructor who may distribute relevant course information or announcements via email. The Faculty of Arts and Science regularly communicates with students via email. Check your mymacewan.ca email regularly *or* forward it to an email address you check regularly. If you use email to communicate with your instructor, you *must* use your mymacewan.ca account. This is to protect your privacy; if a non-mymacewan.ca account is used, there is no way for an instructor to verify the identity of the sender.

13. **Learning Materials:** Students can purchase all learning materials on the bookstore website (https://www.macewanbookstore.com/). The bookstore offers free shipping inside of Alberta and a reduced rate of $10 outside of Alberta. Students also have the option to purchase online and pick up materials on campus: curbside pickup is available at the south 106 street parking turnaround (outside Towers Pub) from 10 a.m. – 2 p.m., Monday to Friday.

    Staff will provide support for students that need to purchase in person. Students are encouraged to call 1-866-418-0391 with any questions, or check the bookstore website (https://www.macewanbookstore.com/) and social media feeds for updates.

14. **Technology Recommendations:** Access to sufficient technology and reliable internet access may be necessary to complete University-level online classes at MacEwan. Instructors expect that students are able to complete work on time through the systems provided on the MacEwan Portal. While tablets, smartphones and other mobile devices are not guaranteed to work; the responsibility for completion is the student's. Successful completion may depend on an adequate Windows or Mac based computer. If you do not have a reliable computer and/or internet access, you may be able to borrow these from the MacEwan library. Check with tech support (techsupport@macewan.ca) for more information.

15. **Statement Regarding Recording of Courses by Students:**
    In this class, students may not make audio or video recordings of any course activity unless the student has an approved accommodation from Access and Disability Resources permitting the recording class meetings. In such cases, the accommodation letter must be presented to the instructor in advance of any recording being done and all students in the course will be notified whenever recording will be taking place. Students who are permitted to record classes are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded.

16. **Disclaimer and Important Notice:** See Disclaimer and Important Notice information (https://calendar.macewan.ca/disclaimer-important-notice/)

17. <mark>***The University reserves the right to modify or replace the method of delivery for the course, including a temporary or permanent suspension of in-person learning in favour of virtual or online learning at any time before or during the course where the University determines that the delivery of in-person learning presents a risk to the health or safety of the University or to a member of the MacEwan University community, or for any other reason as determined by the University. Any change in the method of delivery for the course will be announced via email notification to students' MacEwan email addresses.***</mark>

Disclaimer: *The information in this course outline is subject to change. Any changes will be announced in class or, if applicable, in the laboratory.*

Tentative Weekly Schedule for Stat 151 Winter 2021

DATE	SECTION (Text)	TOPICS	MODULES (BB)	DUE DATES
Week 1 Jan. 6–8	1.1-1.2 2.1	Statistics basics and simple random sampling Data types: quantitative and qualitative	Module 1	
Week 2 Jan. 11–15	2.2-2.5 3.1-3.5	Graphical description of data: bar, pie chart; dotplot; stemplot; histogram; scatterplot Numerical description of data: measures of centre, variation; shape, relative standing; five-number summary and boxplot	Module 2	**Jan. 15**: last day to add or drop. No tuition and fee adjustments after this date.
Week 3 Jan. 18–22	4.1-4.6 4.8	Sample space, event, rules of probability, conditional probability, multiplication rule, independence Counting Rules	Module 3	
Week 4 Jan. 25–29	5.1 5.2 5.3	Discrete Random variable and probability distribution Mean and variance of a discrete random variable Binomial distribution	Module 4	**Jan. 26** **Assignment 1** (Modules 1 & 2) **Jan. 28** **Lab Quiz 1** (Modules 1 &2)
Week 5 Feb. 1–5	6.1-6.3 6.4	Normal distribution and area under the standard Normal curve Assess Normality using normal probability plot	Module 5	
Week 6 Feb. 8–12	7.1-7.3	Sampling distribution of sample mean and central limit theorem	Module 6	**Feb. 9** **Assignment 2** (Modules 3 & 4) **Feb. 11** **Lab Quiz 2** (Modules 3 & 4)
Week 7 Feb. 15-19		**Family Day and Reading Break (No Classes)**		
Week 8 Feb. 22-26	8.1-8.3	Confidence interval for a population mean, margin of error and sample size calculation **Midterm Exam (Thursday, February 25)**	Module 7	**Feb. 23** **Assignment 3** (Modules 5 & 6)

Week	Section	Topic	Module	Deadlines
Week 9 March 1-5	9.1-9.3 9.4	Elements of hypothesis testing and hypothesis tests for one-population mean: critical-value or/and P-value approach One-sample z test when σ is known	Module 8 (Part I)	**March 4** **Lab Quiz 3** (Modules 5 & 6)
Week 10 March 8-12	9.5 10.2-10.3	One-sample t test when σ is unknown Comparing two population means using two independent samples	Module 8 (Part II) Module 9 (Part I)	
Week 11 March 15-19	10.5 12.1-12.2	Comparing two population means using paired samples Hypothesis tests and confidence interval for one population proportion (optional)	Module 9 (Part II) Module 10	**March 16** **Assignment 4** (Modules 7 & 8) **March 18** **Lab Quiz 4** (Modules 7 & 8)
Week 12 March 22-26	13.1-13.2 13.3-13.5	Chi-square goodness-of-fit test Chi-square independence/homogeneity test	Module 11	
Week 13 Mar. 29-Apr. 2	16.1-16.3 14.1-14.4	One-way ANOVA Descriptive methods in regression and correlation	Module 12 Module 13 (Part I)	**March 30** **Assignment 5** (Modules 9, 10, 11) **April 1** **Lab Quiz 5** (Modules 9 & 11)
Week 14 April 5-9	15.1-15.3	Inferential methods in regression **Lab Exams will be 90 minutes long and available on Blackboard for 24 hours (from 8 pm Wednesday April 7 to 8 pm Thursday April 8). Students may use course material, R and RCmdr, and a calculator. Lab exams may not be deferred.**	Module 13 (Part II)	**April 6** **Assignment 6** (Modules 12 & 13 Part I) **April 8** **Lab Final Exam**
Week 15 April 12	**Review**			