

## Applied Statistics II

Stat 252 (ASo1)

**Fall 2023**

**Instructor:** Dr. Karen Buro  
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**Lecture Time:** MWF 11:00 - 11:50 AM  
**Office Hours:** ??

**Course Credits:** 3  
**Course Hours:** **Lecture 45   Lab 24   Seminar 0**

**Course Prerequisite(s):** A minimum grade of C- in one of STAT 141, STAT 151, STAT 152 or STAT 161

Students are responsible for having all prerequisites required for a given course. Prerequisite checks are periodically carried out and any students who do not have the appropriate prerequisite may be removed from the course. If you are removed from the course, you may be responsible for any tuition costs up to the date of removal.

Transfer Credit as prerequisite: Any courses from another post-secondary institute cannot be used as a prerequisite until assessed and officially approved as transfer credit.

**Course Description:** Fundamental methods in applied statistics are presented in this course, including the following topics: factorial ANOVA and Linear Regression models and their analysis, as well as non-parametric statistical tools for the comparison of the center of distributions. Applications are taken from a broad variety of areas such as biological, social, and computer sciences, engineering, and economics.

**Course Objectives:** Upon completion of this course, the student will be able to...

- Choose between parametric and non-parametric statistical tools when comparing the center of distributions
- Analyze data using parametric and non-parametric procedures
- Conduct a factorial ANOVA to answer research questions in the applied sciences
- Apply multiple linear regression to solve practical problems
- Explain the effect of interaction in ANOVA and regression models
- Check the assumptions required for tools, ANOVA, and linear regression analysis
- Completely interpret results obtained through statistical analyses

### Learning Materials:

1. Course notes posted online
2. Textbook (optional): Introductory Statistics, any Edition, by Neil A. Weiss, published by Pearson.
3. Laboratory Manual: SPSS manual (available on meskanas).
4. Course material posted on meskanas
5. A scientific calculator

**Course Format:** This course will be conducted face-to-face on campus at the scheduled time and location listed above. It is not designed to be a hybrid or online course. Students will be required to come to class to learn the relevant course material. Additionally, most course related announcements will be made at the start of each lecture.

### Stat 252 Labs with SPSS

In the labs, you will be using the SPSS software package for data analysis. SPSS is one of the most frequently used statistical software packages. With a little practice, you can perform the complex calculations needed for statistical analyses of large sets of data in a relatively routine manner. There will be a total of five lab assignments to be completed in this course

### Assignments:

1. All assignments will be submitted through Crowdmark
2. **Very important:** Late assignments will **not** be accepted
3. Assignment questions and solutions will be posted on meskanas.

	Homework Assignments	Lab Assignments
1	Sept 15	Sept 22
2	Sept 29	Oct 6
3	Oct 13	Oct 20
4	Oct 27	Nov 3
5	Nov 10	Nov 24
6	Dec 1	Dec 1(not for marks)
		Lab Exam (Dec 4 – Dec 8)

### Evaluation:

<b>Midterm Exam</b>	20%
<b>Final Examination*</b>	35%
<b>Homework Assignments</b>	20%
<b>Lab Assignments</b>	15%
<b>Lab Final Exam</b>	10%
	<b>100%</b>

**Examination Dates:****Midterm exam:** Friday November 3, 2023 in class**Lab Final Examination:** in the week from Dec 4 – Dec 9**Final Examination\*:** TBA

\*Students are responsible for verifying the date of the final exam in the MyStudentSystem

**Format of Examinations:** All exams are closed book and include short and long answer questions.

**Grading:**

The official grading system at MacEwan University is the 12-point letter grade system. While instructors may use percentages to aid in their grade development, percentages are not part of MacEwan University's official grading system. Please see policy [C2020: Grading](#).

Grade	Percentage	Grade Point	Descriptor
A+	95-100	4.0	Outstanding
A	90-94	4.0	Excellent
A-	85-89	3.7	
B+	80-84	3.3	Good
B	75-79	3.0	
B-	70-74	2.7	
C+	65-69	2.3	Satisfactory
C	60-64	2.0	
C-	55-59	1.7	
D+	50-54	1.3	Poor
D	45-49	1.0	
F	0-44	0.0	Fail

**Please Note:**

1. Official grades will be provided by the Office of the University Registrar through myStudentSystem.
2. A minimum grade of C– is required to receive transfer credit or to satisfy a prerequisite for a higher level course.
3. **In order to obtain a C- or better in the course, a student must obtain a minimum of 40% on the final examination.**

**Recorded Course Material:** 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.

## STUDENT RESPONSIBILITIES AND COURSE EXPECTATIONS:

**Students must communicate with their instructors using their myMacEwan email accounts.**

Students must be aware of their academic and non-academic responsibilities as outlined in the [Student Code of Conduct Policy](#) and available on the [Office of Student Conduct](#) website.

**1. ACADEMIC INTEGRITY:** Students are responsible for understanding the [Student Academic Integrity Policy](#) and what constitutes academic misconduct and be aware of the [Student Academic Misconduct Procedure](#). All incidents of academic misconduct, as outlined in the policy, are reported and recorded by the [Academic Integrity Office](#) and resources are available on MacEwan's [Academic Integrity](#) website.

MacEwan University's Academic Integrity Policy 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

In this course appropriate collaboration is defined by: **READ THIS**

- exchanging ideas for how to approach **assignment questions** is acceptable
- all submitted work must have been completed individually
- all quizzes and exams can only include work created by the submitting student
- any material created and submitted as part of a graded course component, students will only access authorized resources (e.g. textbooks, course readings etc.) and use technological aids only as permitted by the instructor.
- students will not share test, exam, or assignment questions or answers through social media, posts, texting, or otherwise.
- Students are prohibited from using **generative artificial intelligence tools**, such as ChatGPT and DALL.E 2, on their assessments in this course.

**2. REGISTRATION STATUS:** Students are responsible for ensuring the accuracy of their registration in courses. This can be checked at any time using *MyStudentSystem*.

**3. PREREQUISITES:** Students who do not have the appropriate prerequisite may be removed from the course and may be responsible for any tuition costs up to the date of removal.

**4. WITHDRAWING FROM THE COURSE:** Students who stop attending class must officially withdraw from the course. This must be done by the official withdrawal deadline for the course, which is available at the Office of the University Registrar. Failure to withdraw properly will result in a grade being assigned that is based on completed course work only, with a grade of 0% being assigned to all missed exams/assignments.

**5. SPECIAL ACCOMMODATIONS:** Please see the [Human Rights and Accessibility Policy](#) and [Students with Disabilities Procedure](#).

Students who require special accommodation in this course due to a disability and/or medical condition are advised to discuss their needs with [Access and Disability Resources \(ADR\)](#).

**6. FINAL EXAMS:** See [Student Assessments Policy](#) and [Grading Policy](#). Students are responsible for confirming the date, time, duration and location of the final exam.

**7. LATE ASSIGNMENT (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.

#### **8. RE-EVALUATION OF MARKS**

MacEwan [Grading Procedure](#) (Section 3.8) states that if a student feels an error has been made on the evaluation of submitted course work, the student is required to first contact the Instructor, via email, within four (4) business days of the mark being released. The Instructor shall respond within four (4) business days. If unresolved and the student has reason to believe the mark has been unfairly assessed, then the student may apply for a reassessment for any submitted assessment, which constitutes at least 10% of the final course grade. Requests for reassessment must be submitted to the applicable Department Chair (or designate) within four (4) business days of the Instructor sending a response to the student. The student must complete and submit the request form, available from the [Office of the University Registrar Forms Cabinet](#).

**9. APPEALS:** Please note anything that has its own appeals policy (e.g. [Student Academic Integrity Policy](#), [Grading Policy](#), [Student Non-Academic Misconduct Procedure and Academic Integrity policy](#)) is exempt from the [Student Appeals](#) policy. Students may contact [Student Affairs](#) for assistance.

<https://www.macewan.ca/about-macewan/administration/student-affairs/> [Student Affairs](#) for assistance.

#### **INSTRUCTOR COURSE POLICIES/SUPPORT:**

- 1. Late penalties/procedures for missed exams or late assignments:** When students miss an exam, test, or quiz the instructor should be notified of the reason within 48 hours. Valid reasons for missing the exam include illness, jury duty or

court subpoena, death in the family, or other emergency approved by the instructor. It is the student's responsibility to keep up with class work when they are absent from class. Absence from class will not be accepted as a legitimate reason for failure to attend an exam on time.

If a student misses a midterm because of illness or other circumstances approved by the instructor, then the student will receive an excused absence for the missed exam. The final exam mark (in percent) will then also be used as the midterm mark in the calculation of the final grade. If possible, the student must arrange this with the instructor before the exam, by emailing the instructor using the email address listed above.

### [Deferred Exams](#)

#### **2. Attendance/Participation**

Students are expected to attend all lecture and lab sessions. Important course related information may be shared during the sessions.

#### **3. EXAMS:** Your student photo I.D. is required at exams to verify your identity. At the discretion of the instructor, students may or may not be allowed to begin an examination after it has been in progress for 15 minutes. Students must remain in the exam room for at least 20 minutes from the time the exam commenced.

Consumption of food is not allowed during exams. Electronic equipment, other than calculators, is not to be brought to exams and hats should not be worn.

#### **4. ELECTRONIC DEVICES:** Cell phones and other electronic devices are to be turned off during lectures, labs, seminars, and exams (except under exceptional circumstances in which approval has been granted by the instructor). Laptop use is permitted only for taking class notes and/or following slides.

#### **5. GETTING HELP:** Students are responsible to seek out any assistance you need in the course. There are other university resources and supports that are available to help:

For support regarding course materials, Math & Stats Learning Center.

For technical support, contact [techsupport@macewan.ca](mailto:techsupport@macewan.ca).

For m&st support, contact [dle@macewan.ca](mailto:dle@macewan.ca).

For psychological or emotional distress or anxiety, contact [Wellness and Psychological Services](#) 780-497-5063 [WPS@macewan.ca](mailto:WPS@macewan.ca) or [Peer Support Services](#).

For Student Support (SAMU) see [Student Advocacy Centre](#) or [Student Resources](#)

For help with financial issues, contact [Fees and Financial Aid](#) 780-497-5025 or [studentloans@macewan.ca](mailto:studentloans@macewan.ca)

You may be eligible for a [scholarship, award, or bursary](#), click link for more information.

### **DISCLAIMER:**

The information in this course outline is subject to change and any changes will be announced in class or in writing.

### Lecture Schedule

Tentative Lecture Schedule for STAT 252, Fall 2023.

All references are to material in Introductory Statistics, Weiss (in case you still have it from Stat 151).

Week	Topic	Reference
1 – 3 Sep 6 – 8, 11 – 15, 18 – 22	Review of Inferential Statistics: confidence intervals, hypothesis testing, comparing two populations, t-distribution, p-values, assumptions (violation)	Chapters: 8, 9, 10  3 Weeks
4 – 6 Sep 25 – 29 Oct 2 – 6, 9 – 13 Oct 9 Thanksgiving	ANOVA, F-distribution -- the logic, the procedure, multiple comparisons, contrasts, residual analysis Randomized Block Design Two Way ANOVA	Chapter 16 Module C  3 Weeks
7 – 8 Oct 16 – 20, 23 – 27	Non-parametric Statistics: One population (Signed-rank test) Two populations (Mann-Whitney test, Wilcoxon Signed Rank test), More than two populations (Kruskal-Wallis test)	10.4, 10.6, 16.5  2 Weeks
9 – 10 Oct 30 – Nov 3 Nov 6 – 10, 13 – 17	Review: Simple Linear Regression The model, correlation, model fitting, model assessment ( $R^2$ , residual analysis), inference, model application and interpretation <b><i>MIDTERM EXAM November 3rd</i></b> <i>November 13 – 17 (no classes, Reading Break)</i>	Chapter 14, 15.1-15.3 2 Weeks
11 – 13 Nov 20 – 24, 27 – Dec 1, 4 – 8	Multiple Linear Regression The model (higher order terms, categorical predictors, interaction), model fitting, model assessment (adjusted $R^2$ , residual analysis), inference, model application and interpretation  Review <b>LAB EXAM: in the week of Dec 4 – Dec 8</b>	Modules: A, B  2.5 Weeks

### APPENDIX

## Homework Assignments

Students will have to hand in solutions for homework assignments and lab assignments every other week. Some of the homework assignments involve the analysis of data, which require the use of a calculator: computer output is **not** acceptable.

1. All assignments will be submitted through Crowdmark (you scan and submit online)
2. **Very important:** Late assignments will **not** be accepted.
3. When you receive back the marked assignments check if you have any concerns with the marking. If you have concerns, please bring them to my attention. I will either explain the rationale or amend your record on my mark sheet.
4. Solutions will be posted after the due dates. Please make a habit of checking your solutions, even if the marker assigned you a perfect score. This will serve not only as a review, but it may possibly also bring to your attention an alternate approach to solving problems and may even identify, to your advantage, the situation where the marker may have given you credit for an incorrect solution. This is very rare, but this knowledge will spare you from losing valuable marks in examinations, and also serve as your personal quality control device.

## Using SPSS for data analysis (Labs)

Calculators and computers are indispensable tools for statistical analyses. A computer is essential when analyzing large data sets or when using complex statistical procedures. In the labs, you will be using the SPSS software package for data analysis. SPSS is one of the most frequently used statistical software packages. With a little practice, you can perform the complex calculations needed for statistical analyses of large sets of data in a relatively routine manner. There will be a total of five lab assignments to be completed in this course. Before you start working on the lab assignment problems, you should first get familiar with the lecture materials and with the instructions included in the lab manual. The lab exam will be during your last lab session.