STAT 1000 Section A05
Basic Statistical Analysis 1
Winter 2018

Time	Thursday 7:00 p.m. – 9:45 p.m.
Location	200 Fletcher Argue
CRN	50084

Instructor	Jenna Tichon 319 Machray Hall Telephone: 204- 474-8417 Email: jenna.tichon@umanitoba.ca

Web Pages	UM Learn: `http://umanitoba.ca/umlearn` Statistics: `http://umanitoba.ca/statistics` Gradebook: `http://www.stats.umanitoba.ca/gradebook`
Office Hours:	Monday 11:00 p.m. – 12:00 p.m. Thursday 5:00 p.m. – 6:30 p.m. Friday 1:00 p.m. – 2:00 p.m.

If the above times are not convenient for you, please call, email or speak to me to arrange an alternate time to meet. I will do my best to return all email or telephone messages within 24 hours.

Calendar Description

(Formerly 005.100) An introduction to the basic principles of statistics and procedures used for data analysis. Topics to be covered include: gathering data, displaying and summarizing data, examining relationships between variables, sampling distributions, estimation and significance tests, inference for means. Not to be held with STAT 1001, STAT 2220 (005.222). Prerequisite: Any grade 12 or 40S Mathematics, or equivalent.

Teaching Philosophy and Goals

It is the desire of the Department of Statistics to present this course in a manner that emphasizes and illustrates the statistical analysis arising from "real-world" applications. Whenever possible, we will attempt to bring real-life examples and data into the classroom. Upon completion of this course students can proceed in many directions: to further intensive study of statistics, to one or more additional courses in statistics, to the use of statistical methods in other fields of study, or to being a consumer of statistical information in daily life. It is our objective to serve all of these diverse directions.

The course is designed to include basic topics deemed crucial for problem formulation and understanding of the foundations of statistical thinking and reasoning. The concepts of statistical analysis will be stressed. The course will place an emphasis on the development of critical thinking skills.

Software will be used in this course to aid in the analysis of data. The computer program that has been selected for this course, Microsoft Excel, is easy to use and is available free for use with Mac or Windows systems. The program also has many advanced statistical features that you will find useful in subsequent courses.

We are interested in feedback from you. If you can think of ways in which this course could be improved, please let us know.

Evaluation

i►clicker Questions/Participation	5%
Quizzes	10%
Midterm Test	35%
Final Examination	50%

Marks for i►clicker sessions, quizzes and the midterm test will be posted on the gradebook (see the web link on Page 1).

Subject to the caveat in the paragraph below, the following are the minimum percentage grades required to receive each of the various letter grades: A^+ (90%), A (80%), B^+ (75%), B (70%), C^+ (65%), C (60%), D (50%).

There is an **additional requirement** for obtaining a C in the course: **to obtain a grade of C or better, you must obtain at least 50% on the final examination**.

Exam Information

The midterm test will be held **Wednesday, February 28, 2018 from 5:30 p.m.– 7:30 p.m.** and will cover Units 1 – 5 in the course outline. The final exam will be 3 hours in duration and will be scheduled by the Student Records Office. The final exam will cover Units 1 – 11, with emphasis on Units 6 – 11. Students missing the midterm test for a valid reason (and with documentation) will be permitted to write a deferred midterm test at a later date.

The midterm will consist of only multiple-choice questions. The final examination will contain both multiple-choice questions and a written component, in an approximate 60:40 ratio.

For quizzes, the midterm test and the final examination: (i) nonprogrammable handheld calculators are permitted (graphing calculators are **not** permitted), (ii) electronic devices, such as cell phones or headphones, are prohibited, (iii) statistical tables will be provided, if required, and (iv) a formula sheet with selected formulas will be provided (for the midterm test and final examination only).

i▸clickers and Participation

Throughout the course, extensive use of the i▸clicker classroom response system will be made in order to enhance your understanding of the material and promote classroom participation. Note that i▸clicker participation constitutes a portion of your grade in this course and as such you are required to bring your i▸clicker to each class and to ensure that it has functional batteries.

For every i▸clicker response you give, you will be awarded 1 point. For questions with a correct answer, an additional point will be awarded for selecting the correct response. You will also be given two marks that count towards your participation mark for completing and handing in the end of class reflection paper. It must be turned in at the end of the relevant class to receive marks. Full marks (5/5) will be given if you receive at least 75% of the total possible points. Partial marks (3/5) will be given if you receive between 50% and 75%. No marks (0/5) will be given if you receive less than 50%.

The use of another student's i▸clicker constitutes impersonation and is strictly forbidden under the University of Manitoba's academic dishonesty policy. (See page 4.)

Please register your i▸clicker at `https://www.stats.umanitoba.ca/register/iclicker`. You will need to enter the 8-character i▸clicker ID found on the back of your remote.

Tutorials & Quizzes

You will attend a tutorial once per week (beginning from January 17 – 23). Your T.A. will go through practice questions, which will be posted in advance on UMLearn. It is recommended that you attempt the questions in advance, and that you print them out and bring them with you to the tutorial. You should also bring your calculator.

There will be four quizzes throughout the term, which will be written during the tutorial time. Your T.A. will distribute a handout at your first tutorial with the quiz dates for your section. The material covered on each quiz will be announced in advance in class and on UMLearn. The quizzes are worth 10% of your final grade in the course. Only your best three of four quiz marks will count towards your final grade. **You must attend and write the quizzes in the tutorial section in which you are registered**. There will be no make-up quizzes.

Assignments

There will be no formal assignments in this course. However, numerous practice problems (with solutions) will be posted for each unit. Students are strongly encouraged to try these practice problems on a regular basis.

Software Download

The latest version of Microsoft Excel (2016) can be downloaded to your computer by logging into your university email at `http://365.myumanitoba.ca`, clicking on the gear icon  in the top right corner, and then selecting Office 365. On the webpage that opens in a new tab, click on Software in the Settings group and follow the instructions from there.

Supplementary Resources

The following books are recommended for reading and extra practice. They are available for download free of charge.

- Introductory Statistics, OpenStax College, Rice University (2013)
  `http://www.stats.umanitoba.ca/book/intro-stats/`
- Basic Statistics, Rand R. Wilcox, Oxford University Press (2009)
  `http://www.stats.umanitoba.ca/book/basic-stats/`

Note that these supplementary texts are provided for extra reference and practice only. Coverage and notation may differ somewhat from the course notes. (Notes may cover topics that are not covered in the textbooks or vice-versa.) **Where there are any discrepancies between the way topics are covered in the course notes and in the suggested textbook references, please refer to the course notes**.

UMLearn: All course material will be posted on UMLearn in the Contents section. All important dates can be found on the calendar and I will make class announcements through the news feed on the course website. At the end of every class, I will post guided checklists of what you should be doing to follow up on that class' lecture and what you should do to prepare in advance for the next class' lecture.

In addition, there will also be discussion forums available. For each class I will open up a discussion forum where I will post the material covered that class, any announcements, and suggestions for preparation for the next class. Please be in the habit of checking it after every class. If you have questions about anything during the lecture or any announcements, you can ask directly on the forum for the relevant class.

All discussion will be monitored closely by me. Please be courteous in posing questions and replying to questions on the board. Your best effort should be made to make clear questions in complete English sentences.

Statistics Help Centre

In room 311 Machray Hall (which contains a number of computers), graduate students and senior undergraduate students in statistics are available to help you at the following times (from January 15 to April 6):

Monday	9:30 a.m. – 3:30 p.m.
Tuesday	9:30 a.m. – 7:00 p.m.
Wednesday	9:30 a.m. – 2:30 p.m.
Thursday	9:30 a.m. – 7:00 p.m.
Friday	9:30 a.m. – 12:00 noon.

Note: The lab will be closed on holidays and during the Winter term break (February 19 to 23).

Voluntary Withdrawal

The voluntary withdrawal date is **March 16** (by which time you will have received your marks for the first two quizzes, the midterm test and several i►clicker sessions).

Academic Dishonesty

It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

`http://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html`

Using Copyrighted Materials

Please be mindful and respect copyright throughout this course. All course notes, assignments, tests, exams, practice exams, and solutions are either my own intellectual property or that of the Department of Statistics. If I use any copyrighted material in my lectures I will properly source and follow copyright guidelines and I expect you to do the same. The copyrighted works are made available for your personal use and study and must not be distributed in any format without express permission.

You do not have permission to upload any course notes, tests, assignments, or handouts to any note sharing websites. Please see the following site for more information: `https://umanitoba.ca/student/resource/student_advocacy/media/Message_note_sharing_December_2013.pdf`

No video or audio recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without my permission.

Use of Electronics in the Classroom

Please ensure that any technology used in the class is used in a responsible, efficient, ethical and legal manner that is mindful of the students around you. You may have cell phones on

your person as long as they are kept on silent and are not brought above table height. You may use laptops or tablets in class to help with note taking or follow along with any computer demonstrations but please keep only academic matters up on your screen and refrain from distracting the students around you.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see

`http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html`

E-mail: To schedule an appointment outside of office hours or to ask a question that would not be suitable for the discussion forums (it involves your personal information or the answer would not be of interest to other students) you may email me at my university email address. Please note that if your question is answered on the course outline (which will be posted on UMLearn) I will simply direct you to find the answer yourself. The subject line of your emails should contain "STAT 1000 A05". All emails should start with an opening salutation, be written in complete English sentences and be signed with your name and student number. Please note that I will not divulge grades over email. All emails received during the work week will be replied to within 24 hours. While I will generally check my work emails over the weekend in case there is an emergency, you can expect a reply to non-urgent matters received over the weekend by Monday at noon.

Office Hours: My office hours are listed at the top of the course outline. You do not need to make an appointment and may just show up to ask any questions that you may have. This is the perfect time to ask questions about course material, your assignment, review your coursework, or receive help with R. If you can not make my scheduled office hours, please email me to make an appointment.

You are required to obtain and use your U of M email account for all communication between yourself and the university.

Expectations: I Expect You To

In my class I expect you to:

- Attend lectures and listen attentively.
- Participate in small group activities when asked.
- Use technology respectfully as outlined in the syllabus.
- Come prepared the class with paper, writing utensils, a scientific calculator, your i-clicker, and any needed statistical tables.

- Arrive to your exams with writing utensils, a scientific calculator, and a ruler if appropriate.
- Do your utmost to arrive on time and be as quiet as possible should you unavoidably need to arrive late or leave early.
- Not talk to your neighbours while I am lecturing.
- Ask questions during my lecture as needed and interrupt me if I write something incorrect on the overhead.
- Be respectful of your lab T.A.s and extend to them all courtesies you would extend to me.
- Be mindful of my time outside of class and allow me sufficient time to answer emails or look in to your concerns.
- Follow all policies in the syllabus and consult it as needed.
- Come to me with any constructive feedback that would improve the running of the course.

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

`http://umanitoba.ca/student/saa/accessibility/`

Expectations: You Can Expect Me To

As your instructor you can expect me to:

- Treat you with respect inside and outside of the classroom.
- Arrive early to class and remain for a few minutes afterwards to answer questions.
- Come prepared to my lectures.
- Be available during my office and make my best attempt to provide sufficient notice if an office hour needs to be moved or canceled.
- Answer your questions thoughtfully and follow up if needed.
- Listen to your feedback/concerns and do my best to take reasonable requests in to account.

- Monitor the lab demonstrators and ensure quizzes are retuned in a reasonable time period.
- Set assessments that are reasonable and contain questions that match the learning objectives for the course.
- Be passionate about my subject and what I teach.

Course Schedule and Evaluation

Week	Content	Special Notes
Week 1 Jan 1-5	Welcome & Unit 1	First day, Jan 4 No lab
Week 2 Jan 8-12	Unit 1	No lab
Week 3 Jan 15-19	Unit 2	Jan 16, end of revision period Lab begins Jan 17
Week 4 Jan 22-26	Unit 2	
Week 5 Jan 29 - Feb 2	Unit 3 & 4	
Week 6 Feb 5-9	Unit 5	
Week 7 Feb 12-16	Unit 5 & 6	
Week 8 Feb 19-23	No Class	Reading Week
Week 9 Feb 26 - Mar 2	Unit 6	Midterm Exam 5:30-7:30
Week 10 Mar 5-9	Unit 7	
Week 11 Mar 12-16	Unit 8	Mar 16, VW Date
Week 12 Mar 19-23	Unit 8 & 9	
Week 13 Mar 26-30	Unit 9	
Week 14 Apr 2-6	Unit 10 & 11	Last Class, Apr 5

Please note that all dates for content coverage in these schedules are approximate and subject to minor changes.

ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UMLearn page.

Course Outline

Unit 1 – Examining Distributions

- types of variables: quantitative, categorical, nominal, ordinal
- graphs for categorical variables: bar charts, pie charts
- graphs for quantitative variables: stemplots, histograms
- examining distributions, dealing with outliers
- time plots
- describing distributions with numbers: mean, weighted mean, median, quartiles, percentiles, interquartile range, range, variance and standard deviation
- five-number summary and boxplots
- the $1.5 \times$ IQR rule for suspected outliers, outlier boxplots
- resistant measures

Unit 2 – Scatterplots, Correlation and Regression

- association, response variable, explanatory variable
- examining scatterplots
- correlation
- least-squares criterion and least squares regression line
- r^2
- residuals, outliers, influential observations
- cautions about correlation and regression
- association vs. causation, lurking variables
- extrapolation

Unit 3 – Sampling Design

- populations and samples
- voluntary response sample
- convenience sample

- simple random sample
- census
- stratified random sample, multistage sample
- undercoverage, nonresponse

Unit 4 – Design of Experiments

- observations vs. experiment
- experimental units
- factors, factor levels, treatments
- placebo effect, control group, bias
- principles of experimental design
- completely randomized design
- randomized block design
- matched pairs design

Unit 5 – Density Curves and Normal Distributions

- continuous random variables, density curves
- normal distributions
- 68–95–99.7 rule
- standardizing observations (z-scores)
- normal distribution calculations

The midterm test covers material from Units 1 – 5.
The test is on **Wednesday February 28, 2018** from 5:30 p.m. – 7:30 p.m.

Unit 6 – Randomness and Probability

- randomness, the language of probability
- probability models, sample space, events, unions, intersections
- some probability rules, independence, general addition rule
- discrete random variables
- binomial setting and binomial distribution

Unit 7 – Sampling Distributions

- sampling distribution of a sample mean
- bias and variability
- Central Limit Theorem
- sampling distributions for proportions

Unit 8 – Confidence Intervals for a Population Mean

- estimating with confidence
- margin of error
- effect of sample size, confidence level, standard deviation
- effect of population size
- assumptions
- choosing the sample size
- one-sample t procedures

Unit 9 – Tests of Significance

- tests for a population mean (σ known and σ unknown)
- hypotheses, test statistic, P-value, statistical significance
- two-sided tests and confidence intervals

Unit 10 – Matched Pairs t Procedurs

- matched pairs t procedures

Unit 11 – Inference for a Population Proportion

- confidence intervals and tests for a population proportion
- choosing the sample size

The final examination covers material from Units 1 – 11, with emphasis on Units 6 – 11. The exam is 3 hours in duration and will be scheduled by the Student Records Office.
