



MAT 225 Basic Statistics

Class Days/Times/Room: Monday and Wednesday / <i>lu:nas c miaklos</i> , 11.30 am to 12.45 pm, room 2, Gewkdag <i>şon ki</i>, Main campus / S-cu:k Du'ag Maşcamdam	Spring (<i>hu:kalig</i>) 2019
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Instructor: Richard LEE	Regular Phone: 520 383 0062 Cell Phone/Voice Mail: 520 205 2123 (text and photo acceptable: be professional!) E-mail: rlee@tocc.edu or rlee@glasscity.net Office location: Faculty Building / Ha-Maşcamdam Ha-Ki 121 Office hours: Tuesday / <i>ma:ltis</i> 10:00 to 4:00, subject to change depending on meetings, etc.
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Course Structure:
 This course will be operating on a combination of traditional lecture, group activity, and discussions that will enhance the student's knowledge of statistical concepts. Some of this work will need to be done outside of class.

Course Description:
 Introduction to statistical concepts and methods of business. Includes statistics, data, and statistical thinking; methods for describing sets of data, probability, sampling distributions, inferences based on single sample and two samples; estimation with confidence intervals and tests of hypothesis, correlation and regression - *if time permits: time series, design of experiments and analysis of variance (ANOVA), and categorical data analysis.*

Student Learning Outcomes (SLOs) :

After completion of the course students will be able to:

1. Develop statistical literacy
2. Collect, analyze, and present data.
3. Understand experimental and theoretical probability rules
4. Know how expected value works with emphasis on Tohono O'odham issues - understand how expected value plays a role in society (special emphasis on Native issues i.e. the Indian Gaming Act)
5. Use data to make decisions, based on knowledge of the data's sampling distribution, possible confidence intervals and resultant hypothesis tests.

Course Objectives:

During this course students will:

1. Summarize and interpret data visually through appropriate statistical graphs. Calculate and summarize descriptive statistics through analytical and technological means.
2. Analyze bivariate data through scatter plots and test the strength of linearity between the two variables using correlation. Determine whether a regression line is appropriate for the relationship and compute predictions from regression lines.
3. Calculate probability dealing with the normal distribution. Convert a normal distribution into a standard normal distribution by computing the z-score. Apply the Central Limit Theorem appropriately.
4. Recognize the different types of data and methods of collecting data. Determine whether a study or sampling technique provides a representative sample and thus yielding valid results.
5. Calculate basic probabilities (complement, conditional probability) and determine what the range of probability values means. Calculate probability using addition rule for disjoint events and multiplication rule for independent events.
6. Construct a sampling distribution of a statistic (mean and proportion) through generation of repeated simple random samples.
7. Estimate a population proportion and mean by using a point estimate and confidence interval. State the correct interpretation of a confidence interval and also explain the effect margin of error has on sample size and the confidence level.
8. Determine the appropriate sample size for estimating a proportion and mean given a specific margin of error and confidence level.
9. Perform all steps of a hypothesis test for a proportion and mean: state the null and alternative hypotheses; calculate the right test statistic; find critical region(s), calculate the p-value, and determine whether to reject the null hypothesis; and state the conclusion in a clear, simple manner that relates back to the original claim being tested.
10. Use the chi-squared distribution and the laws of probability to determine if an object is acting "normally."
11. Use analysis of variance to make decisions on scientific experiment results

(1 to 9 courtesy the University of Toledo Department of Mathematics and Statistics)

Texts and Materials: *No text needed - I will provide materials. That being said, I am "inspired" by OpenStax's free online [Introductory Statistics](https://openstax.org/details/books/introductory-statistics) by Illowsky, Dean et al. (<https://openstax.org/details/books/introductory-statistics>). Some form of calculating device is essential, although you will have access to all of TOCC's computers. It is strongly recommended that you have working knowledge of Excel.*

Evaluation and Grading & Assignments:

Two tests at 100 points = 200
One comprehensive final exam = 100
Homework in its totality = 200
Total possible points = 500

Some portion of the tests AND the final may consist of a take-home project requiring a substantial amount of both college-level writing AND good computing technique -- use of Excel or Google Spreadsheet on any platform (PC, iPad, cellphone) will be avidly encouraged. Be prepared to explain how you got the answer to any question. To guarantee an A, you must have $500 \times .9 = 450$ points. A B will require $500 \times .8 = 400$ points.

Policies and expectations-

- **T-apedag: Attendance is tracked - even though we are adults.** If you miss class, e-mailing me and contacting the front office **5203838401** are ways of letting me know if you miss class. You still are responsible for any material covered in class. *If you're sick, look out for yourself first, just let me and whomever you're working with in group know if you're not coming in, eh? REMINDER: THIS a group-work based course.*

TOCC policy: "You are expected to arrive to class on time and be prepared to participate in each class period. Four unexcused absences may result in withdrawal and a "W" or "Y" will be recorded. You may request to be excused from class for religious observances and practices, for illness, for school or work-related travel or for personal or family emergency. If you will be absent or have been absent, please notify the instructor as soon as possible (approved by Faculty Senate April 2014) That being said, due to the nature of this course, miss at least two days, excused or not, and I will start looking for you...!"

- Integrity and Honor: I don't mind if you work on the homework in groups. I do expect for you to put your best effort in - and not rely on everyone else to do it. More is available in *the TOCC Student Handbook*.
- Homework and Feedback: **We are adults:** Although I expect homework to be done as soon as the topic(s) are covered, it may be late. Just get it done, really. (*Folks, with the amount of time we have in class scheduled for homework, there's no reason for late.*) Not every question will be checked, but I will be using what you have done wrong as a springboard for class. For this semester, you should spend 3 credit hrs x 3 hrs per credit hr = **9 hours** a week on this course.
- Withdrawal: Final deadline is **March 29th 2019**. By that date, you will have had at least one test. As a general rule, if you have been absent more than 25% of the time (8 classes), you should speak with an adviser immediately. *All institutions of higher education (public, private, religious, tribal) strongly encourage instructors NEVER to ask students to withdraw from a course for both financial aid purposes and respect for the student.* (See *t-pik elida* on previous page.) Again, there are three projects, a final and homework.
- Incompletes (I): This course's nature (you learn something new every class) makes them awkward. However, per TOCC policy, if you have completed $\frac{3}{4}$ of the course and specifically request it, I may consider it. *Please call before final exams to assure enough time to consider your request.*

In handing out an incomplete, I will assume that you: (1) will finish this course on your own time, (2) will receive a form with the I grade filled in and what work *must* be done to complete the course, and (3) will have **nine weeks** to complete the work, else the grade will revert to an F. (effective 2018)

- Makeups: My homework policy has been mentioned beforehand. As for exams, I allow a *reasonable* amount of time – not more than two weeks.
- **Final grades will be available online via Jenzabar.** Per FERPA and the Himdag, I will not give grades over the phone and am strongly discouraged from e-mailing same. (Again, see *t-pik elida* above.)
- Struggling? Tutoring and assistance are available in the Student Success Center in the main building / *i-we:mta ki* and from me during office hours..
- **In accordance with t-pik elida:**
 - the Americans with Disability Act 1990 (ADA) and Section 504 of the Rehabilitation Act: if you have a learning problem, physical disability, or medical illness requiring special arrangements, please inform your instructor at the beginning of the semester so your academic performance will not suffer because of it. We must honor any arrangements from the Disability Resources Office - please ask either Anthony Osborn aosborn@tocc.edu or Ron Felix rfelix@tocc.edu.
 - Title IX: TOCC faculty and staff are dedicated to creating a safe and supportive campus. Title IX and our school policy prohibit discrimination on the basis of sex - this includes sexual misconduct; harassment, stalking, domestic and dating violence and sexual assault. Sexual discrimination and sexual violence **will** undermine students' academic success and quality of life on campus and beyond. We encourage students who have experienced any form of sexual misconduct to talk about their experience and seek the support they need.

Consolidated Course Outline and Homework Assignments. I am going to assume that you have had coursework equivalent to college algebra. If not, see me privately as soon as possible. With this being only the sixth time for me teaching this course, everything you see here is subject to change.

Section	Problems - tentative	Done?
Preliminaries, displaying your data, and what variables go with what data display	1/14, 1/16, 1/23 (1/21 no school, MLK day / taş) Read chapter 1 HW 1: HWTBA (home work to be announced) HW 2: gas tax handout (visuals) - make dotplot and stem-and-leaf by hand, and histogram by software	
Measures, measures and even more measures... s-eda nu:milo c na:nko / "middle number" and spread... not to mention location	1/28, 1/30, 2/4, 2/6 HW3: Gas tax handout (numbers) - using software, find mean, median (and if it exists, mode)... also range and standard deviation. Find the five number summary for the gas tax. Also, calculate what percentile Arizona falls in for same, due 9/18, the day of test 1. Test 1...	
Probability - how often something should happen - and how we keep the lights on at Desert Diamond part 1	2/11, 2/13, 2/20 (2/18 no school, President's day / taş) HW4: Probability homework handout	
Expected value - what should you get or pay out on the average - how we keep the lights on at Desert Diamond part 2... and the essential difference between Natives and Miligan with expected value.	2/25, 2/27, 3/4 HW5: Please read the o'odham dice game handout before class. Expected value homework handout	
Regression and correlation	3/6, 3/18 (spring break 3/9 to 3/17) HW6: HWTBA Test 2...	

Normality - most data isn't - and central limit theorem	3/20, 3/25 HW7: HWTBA	
Getting your target parameter via <i>hapot himdag</i> - confidence intervals	3/27, 4/1 HW8: HWTBA	
Hypothesis testing, or did they honor the treaties?	4/3, 4/8 HW9: HWTBA	
Other interesting topics as needed, based on class interest	4/10, 4/15, 4/17, 4/22, 4/24, 4/29, 5/1, HWTBA	
	Final exam 5/6	

DISCLAIMER: This syllabus is designed to evolve and change throughout the semester based on class progress and interests. You will be notified of any changes as they occur.

Himdag Cultural Component:

My interpretation of what Nabhan said in *the Desert Smells Like Rain* is this: while the *himdag* discourages direct, exact answers, in the mathematical world, one is expected to be able to come up with a precise answer for the situation. That being said, there are a few common issues shared:

- *Baban* (coyotes) are not going to affect your homework or my tests – they didn't write either.
- While one must go through a maze to see *i'toi*, there was no mention as to how many mazes there were to get to him. Likewise, you will discover in this course that there are many different ways to perform the algebra necessary to see the final answer.
- *I-we:tma*: for your success and the college's and the community's, you should not go work on mathematics alone – it can be a group activity (except on the tests, of course).
- *T-Wohocudadag c t-apedag c t-pik elida*: We learn for our well-being. We respect each other, ourselves and our community. We respect and take pride in our own work. We respect each other's abilities, quirks and privacy. We believe in ourselves and others.

References:

- Culin, Stewart. (1975.) *Games of the North American Indians*. New York: Dover Publications.
- Guarin, Jorge. (2011.) *Course syllabus*.
- Hronopoulos, Sophia. (2012.) *Course syllabus*.
- Nabhan, Gary Paul. (1982.) *The Desert Smells Like Rain: A naturalist in Papago Indian Country*. San Francisco: North Point Press.
- Newberry, Teresa. (2012.) *Course syllabus*.
- Sun-bat, Catherine. (2014.) *Course syllabus*
- Tohono O'odham Community College core values website http://www.tocc.edu/core_values.htm (2015.)
- Tohono O'odham Community College Faculty Handbook (2015.)

Assignment	Date	Score
Test 1	2/6/19 at the latest	
Test 2	3/6/19 at the latest	
Final	5/6/19 firm	
Homework	various	200 x __ (number of assignments checked in) / __ total assigned = _____
Total		Add the numbers you have in this column = _____