



TEXAS A&M
UNIVERSITY
CENTRAL TEXAS™

MTHK 3311.110 Probability and Statistics I Spring 2018

Instructor & Contact Information

Mienie Roberts, PhD
Associate Professor in Mathematics
College of Arts and Sciences
1001 Leadership Place, Killeen TX 76549

Office: Warrior Hall 420M

Office Hours: Face-to-face: Monday 1:00pm-2:00pm, 4:45pm-6:00pm
Tuesday 12:00pm-2:00pm

Online: Monday 1:00pm-2:00pm, 4:45pm-6:00pm
Tuesday 12:00pm-2:00pm

Or by appointment

We will use web conferencing software for online office hours.

Mathematics graduate student has face-to-face office hours on Tuesdays and Thursdays from 2:00pm-4:00pm in Warrior Hall 420N.

Class meeting times: Mondays from 2:00pm-4:45pm in Founder's Hall, Room 207.

Work email: dekokk@tamuct.edu or email me on Canvas (preferred).

Cell Phone: 903-705-9703 Feel free to call or text me during my office hours (or any other time) if you have questions.

Texas A&M University-Central Texas Mission Statement

Texas A&M University-Central Texas is an upper-level university offering junior and senior-level coursework needed to successfully complete baccalaureate degrees and all coursework leading to the completion of graduate degrees. The University is committed to high quality, rigorous, and innovative learning experiences, and prepares students for lifelong learning through excellence in teaching, service, and scholarship.

Mode of Instruction & Course Access

This course is a hybrid course and uses the Canvas Learning Management System [<https://tamuct.instructure.com>] as a supplement to the face-to-face learning opportunities. You will use the Canvas username and password communicated to you separately to login to this system. You will also use the R/RStudio software. Student will need access to a computer and internet to fulfill the requirements of the course. All course materials will be posted on:

<http://math3311.altervista.org/>

Student-Instructor Interaction

I will respond to emails and text messages within 24 hours.

UNILERT - Emergency Warning System for Texas A&M University–Central Texas

UNILERT is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in UNILERT through their myCT email account. Connect at www.TAMUCT.edu/UNILERT to change where you receive your alerts or to opt out. By staying enrolled in UNILERT, university officials can quickly pass on safety-related information, regardless of your location.

Course Information

Program Goal

Texas A&M University-Central Texas students, upon completion of certification requirements, will be reflective professional educators who make effective educational decisions that support the creation of dynamic learning environments.

Course Overview and Description: MTHK 3311.110

Math 3311 (Probability and Statistics) is designed to prepare students for the Probability and Statistics domain on the TExES Math 7-12 exam. The class aims to equip students with the requisite knowledge and skills that an entry-level educator in this field in Texas public schools must possess. The class also incorporates R/RStudio as tools for statistical analysis techniques.

Prerequisite(s): MATH 2414 and either MTHK 3305 or an elementary probability course.

Course Objective

Students will become thoroughly proficient in the following areas:

- Data and Statistics
- Descriptive Statistics
- Probability
- Discrete Probability distributions
- Continuous Probability distributions
- Simple linear regression
- Multiple regression
- Regression analysis (model building)

Core Subjects 7-12 Mathematics Math Standards

- ✚ Mathematics Standard IV **Probability and Statistics**: The mathematics teacher understands and uses probability and statistics, their applications and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.

Competencies:

Course materials:

All course materials will be posted to:

<http://rpubs.com/mroberts/350466>

Make sure to navigate to the website on a daily basis, as it will be updated regularly.

All assignments need to be submitted to the CANVAS lms.

Domain IV – Probability and Statistics

Competency 015: *The teacher understands how to use appropriate graphical and numerical techniques to explore data, characterize patterns and describe departures from patterns.*

The beginning teacher:

- A. Selects and uses an appropriate measurement scale (i.e., nominal, ordinal, interval, ratio) to answer research questions and analyze data.
- B. Organizes, displays and interprets data in a variety of formats (e.g., tables, frequency distributions, scatter plots, stem-and-leaf plots, box-and-whisker plots, histograms, pie charts).
- C. Applies concepts of center, spread, shape and skewness to describe a data distribution.
- D. Understands measures of central tendency (i.e., mean, median, mode) and dispersion (i.e., range, interquartile range, variance, standard deviation).
- E. Applies linear transformations (i.e., translating, stretching, shrinking) to convert data and describes the effect of linear transformations on measures of central tendency and dispersion.

- F. Analyzes connections among concepts of center and spread, data clusters and gaps, data outliers and measures of central tendency and dispersion.
- G. Supports arguments, makes predictions and draws conclusions using summary statistics and graphs to analyze and interpret one-variable data.

Competency 016: *The teacher understands concepts and applications of probability.*

The beginning teacher:

- A. Understands how to explore concepts of probability through sampling, experiments and simulations and generates and uses probability models to represent situations.
- B. Uses the concepts and principles of probability to describe the outcomes of simple and compound events.
- C. Determines probabilities by constructing sample spaces to model situations.
- D. Solves a variety of probability problems using combinations and permutations.
- E. Solves a variety of probability problems using ratios of areas of geometric regions.
- F. Calculates probabilities using the axioms of probability and related theorems and concepts such as the addition rule, multiplication rule, conditional probability and independence.

- G. Understands expected value, variance and standard deviation of probability distributions (e.g., binomial, geometric, uniform, normal).
- H. Applies concepts and properties of discrete and continuous random variables to model and solve a variety of problems involving probability and probability distributions (e.g., binomial, geometric, uniform, normal).

Competency 017: *The teacher understands the relationships among probability theory, sampling and statistical inference and how statistical inference is used in making and evaluating predictions.*

The beginning teacher:

- A. Applies knowledge of designing, conducting, analyzing and interpreting statistical experiments to investigate real-world problems.
- B. Analyzes and interprets statistical information (e.g., the results of polls and surveys) and recognizes misleading as well as valid uses of statistics.
- C. Understands random samples and sample statistics (e.g., the relationship between sample size and confidence intervals, biased or unbiased estimators).
- D. Makes inferences about a population using binomial, normal and geometric distributions.
- E. Describes and analyzes bivariate data using various techniques (e.g., scatterplots, regression lines, outliers, residual analysis, correlation coefficients).
- F. Understands how to transform nonlinear data into linear form to apply linear regression techniques to develop exponential, logarithmic and power regression models.
- G. Uses the law of large numbers and the central limit theorem in the process of statistical inference.
- H. Estimates parameters (e.g., population mean and variance) using point estimators (e.g., sample mean and variance).
- I. Understands principles of hypotheses testing.

Student Learning Outcomes

Knowledge Outcomes	1) Apply probabilities to various situations and assess the role of experimental and theoretical probability.	Final Exam, Midterm, MyMathLab Homework Problems, Presentations
	2) Utilize software to represent and analyze data.	Project, MyMathLab Homework Problems, Tests, Final Exam
	3) Recognize the role of and application of probability theory, descriptive and inferential statistics in many different fields.	Tests, Final Exam, MyMathLab Homework Problems, Presentations
Skills Outcomes	1) Create and interpret graphical displays of data, including dotplots, stem-and-leaf plots, and histograms.	Final Exam, Midterm, MyMathLab Homework Problems, Presentations

	2) Employ the process of data analysis, central tendency, variation, variation, and the normal curve.	Final Exam, Midterm, MyMathLab Homework Problems, Presentations
	3) Examine scatterplots of data, and describe skewness, kurtosis, and correlation within the context of the data.	Final Exam, MyMathLab Homework Problems, Presentations

Required Reading and Textbook(s)

The student is not required to purchase a hard copy of the textbook. All required materials (including the e-book) can be found by purchasing an access code to mymathlab.

***A student of this institution is not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer. You will be provided additional required course readings from the professor.**

Course Requirements

Student Learning and Assessment

Final Exam	The Final is a proctored exam and is also comprehensive. The student needs to schedule a time to take the Final at the testing center. You will be able to use a calculator, cheat sheet and the statistical software R on the final exam. The student has one attempt available to take the final exam.
Tests	Your tests will cover the math skill as well as homework assignments. You will have 2 timed, online tests. Student will have 3 attempts at each test.
Online discussions	5 Online discussion worth 10 points each
Math Skills Review using MyMathLab	Homework assignments on chapters 1-10, and 12. Student has infinitely many attempts available for the homework. The due dates can be found in the course calendar.
Presentations	The student will be required to use R for statistical analyses and present the findings by creating a video that will be emailed to: dekokc@tamuct.edu
Midterm	The midterm is a proctored exam on Chapters 1-5. Student needs to arrange for a proctor at the testing center to take the midterm. The student can use a calculator, and R statistical software on the midterm.
Project	Student will be required to complete a project that will cover most topics discussed in the course.

Testing Center

The Office of Academic Support Programs (ASP) provides proctoring, or supervised testing, services for students enrolled in TAMUCT online classes. It is also a part of the Tarleton State and Central Texas College testing networks, serves as a general testing center for Killeen, and is the university resource for verifying and coordinating with proctors at other testing locations.

Testing at TAMUCT is provided free of charge for active TAMUCT students. For non-TAMUCT students, there is a \$15 administration fee, which can be paid on the day of the exam. The student is solely responsible for all testing fees.

All testing requests need to be submitted at least 5 business days before the day of the exam. If submitted in less than 5 business days

Academic Support Programs cannot guarantee the administration of that exam.

To take a proctored exam at TAMUCT:

Submit the TAMUCT Testing Form online. <https://www.tamuct.edu/departments/academicsupport/proctoring.php>

ASP will confirm your requested test time or suggest a new one within two business days.

Plan to arrive at the testing location at least fifteen minutes before the scheduled time. Remember to bring a photo ID, a pencil or pen, and any other supplies that are allowed by your instructor. The proctor is not responsible for providing materials for your test other than scratch paper.

For questions, or if you need testing accommodations, please contact Cecilia Morales in room WH 212C or by:

Phone: 254.501.5830

Fax: 254.501.5807

Email: cecilia.morales@tamuct.edu

Testing Center Hours

Spring available times for proctoring: (see exceptions below)

Hours of Operation

Mondays, Tuesdays, and Thursdays

- 9:00 a.m. to 1:00 p.m. and 2:00 p.m. to 6:00 p.m.

Wednesdays and Fridays

- *Reserved for TExES Teacher Certification exams*

Closed Daily: 1:00pm - 2:00pm

The testing center is located in **Warriors Hall 212**.

Evaluation & Assessment (Grading Criteria)

1.	Tests (2x100).....	20% (200 points)
2.	Final.....	20% (200 points)
3.	Midterm (1x150).....	15% (150 points)
4.	Online discussions (5x10).....	5% (50 points)
5.	Projects (4x100).....	40% (400 points)
Total		100% (1000 points)

Evaluation Summary:

Grades will be assigned at the end of the semester on the following point basis:

A = 90-100

B = 80-89

C = 70-79

D = 60-69

F =59 and below

Posting of Grades

Grades will be updated regularly and posted to Canvas under "Gradebook" after completion of course assignments.

Course Outline & Calendar

MTHK 3311 The instructor reserves the right to modify the calendar for the benefit of the students.

Week 1	Jan 15 Martin L. King Jr. Day No class	Jan 16	Jan 17	Jan 18
Week 2	Jan 22 Face-to-face meeting 1. Download R/RStudio 2. Measurement scales 3. Organizes, displays and interprets data	Jan 23	Jan 24	Jan 25 Online discussion 1 due
Week 3	Jan 29 Face-to-face meeting 1. Concepts of center, spread, shape and skewness 2. Measures of central tendency 3. Measures of dispersion	Jan 30	Jan 31	Feb 1 Test 1 due
Week 4	Feb 5 Face-to-face meeting 1. Linear transformations to convert data and describe effect 2. Analyzes connections between data clusters, outliers and measures of central tendency and dispersion 3. Supports arguments, makes predictions and draws conclusions using summary statistics and graphs to analyze and interpret one-variable data	Feb 6	Feb 7	Feb 8 Online discussion 2 due
Week 5	Feb 12 Face-to-face meeting 1. Concepts of probability through sampling, experiments and simulations 2. Simple and compound events 3. Determines probabilities by constructing sample spaces to model situations	Feb 13	Feb 14	Feb 15 Project 1 due
Week 6	Feb 19 Face-to-face meeting 1. Combinations and permutations 2. Ratios of geometric regions 3. Axioms of probability, addition rule, multiplication rule.	Feb 20	Feb 21	Feb 22 Online discussion 3 due
Week 7	Feb 26 Online class 1. Expected value	Feb 27	Feb 28	March 1
Week 8	March 5 Face-to-face meeting Review for the midterm	March 6	March 7	March 8 Midterm
Spring Break	March 12 No class	March 13	March 14	March 15
Week 9	March 19 Online class 1. Independent events	March 20	March 21	March 22 Project 2 due
Week 10	March 26 Online class 1. Probability distributions	March 27	March 28	March 29 Online discussion 4 due
Week 11	April 2 Online class 2. Normal distribution	April 3	April 4	April 5 Project 3 due
Week 12	April 9 Online class 1. Analyze and interpret statistical experiments and information 2. Sampling	April 10	April 11	April 12 Online discussion 5 due
Week 13	April 16	April 17	April 18	April 19

	Online class 1. Point estimators			Project 4 due
Week 14	April 23 Online class 1. Principles of hypothesis testing	April 24	April 25	April 26 Test 2
Week 15	April 30 Face-to-face meeting Review for the final exam	May 1	May 2	May 3
Week 16	May 7 Face-to-face meeting Final exam	May 8	May 9	May 10

University Procedures & Policies

TAMUCT Department of Curriculum & Instruction Professional Expectations

Texas A&M University-Central Texas clinical teachers are guests in the schools in which they are placed. Each clinical teacher must abide by all regulations and policies established by the district, central administration, campus administrators, and cooperating teachers.

Candidates for teacher certification at TAMUCT will demonstrate the following qualities and behaviors in pursuit of their goal of becoming a professional educator.

Quality	Behavior
Communication	communicate appropriately and effectively with colleagues, supervisors, students, parents, caregivers and community members using various forms
Collaboration	work collaboratively with colleagues, mentors and supervisors to achieve the local, state, and national goals of education
Commitment	demonstrate commitment to the teaching profession and exercise leadership for the advancement of the profession and public education; be responsible, punctual, regular in attendance, and prepared to participate in all aspects of professional development
Professional Development	Take responsibility for utilizing professional teaching practices and constantly strive to improve through professional growth
Ethical Conduct	Uphold the Code of Ethics for Texas Educators and abide by local, state, federal rules, regulations, and policies; demonstrate respect and maintain ethical conduct in relations with professional colleagues, students, parents and members of the community

Attendance Policy

Professional behavior and commitment to teaching are expectations. Attendance and punctuality are required. Not only is your attendance required it is expected that you will come to class prepared to engage in your learning process. Being prepared to participate includes completing assigned reading and bringing necessary assignments and materials to class. It is NOT possible to make up the work missed during the class period since it involves the interactions of students, professor, and content. I will not provide “make-up” work. You may access this work through collaboration with a peer.

You are responsible for asking a classmate to take notes, and gather handouts for missed classes. It is your responsibility to find out what you missed. Being prepared to participate includes completing assigned reading and bringing necessary assignments and materials to class.

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest evaluation of a student’s academic performance and includes, but is not limited to, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student’s work, collusion, and the abuse of resource materials. All academic misconduct concerns will be reported to the university’s Office of Student Conduct. Ignorance of the university’s standards and expectations is never an excuse to act with a lack of integrity. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action. Honesty and integrity are essential characteristics for teachers. Students are required to act honestly and professionally at all times.

Any Violation of the Academic Integrity Policy will result in failure of the class (student will receive an “F”).

Disability Support and Access Services

At Texas A&M University–Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to an education that is barrier-free. The Office of Disability Support and Access is responsible for ensuring that students with a disability enjoy equal access to the University's programs, services and activities. Some aspects of this course or the way the course is taught may present barriers to learning due to a disability. If you feel this is the case, please contact Disability Support and Access at (254) 501-5831 in Warrior Hall, Ste. 212. For more information, please visit their website at www.tamuct/disabilitysupport. Any information you provide is private and confidential and will be treated as such.

Drop Policy

If you discover that you need to drop this class, you must go to the Records Office and ask for the necessary paperwork. Professors **cannot** drop students; this is always the responsibility of the student. The record's office will provide a deadline for which the form must be returned, completed and signed. Once you return the signed form to the records office and wait 24 hours, you must go into Warrior Web and confirm that you are no longer enrolled. Should you still be enrolled, FOLLOW-UP with the records office immediately? You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the deadline or fail to follow the procedure, you will receive an F in the course.

Tutoring

Tutoring is available to all TAMUCT students, both on-campus and online. Subjects tutored include Accounting, Finance, Statistics, Mathematics, and Writing (APA). Tutors are available at the Tutoring Center in Warrior Hall, Suite 111. Visit www.tamuct.edu/AcademicSupport and click "Tutoring Support" for tutor schedules and contact information. If you have questions, need to schedule a tutoring session, or if you are interested in becoming a tutor, contact Academic Support Programs at 254-501-5836 or by emailing c.garza@tamuct.edu.

Chat live with a tutor 24/7 for almost any subject on your computer! Tutor.com is an online tutoring platform that enables TAMUCT students to log-in and receive FREE online tutoring and writing support. This tool provides tutoring in Mathematics, Writing, Career Writing, Chemistry, Physics, Biology, Spanish, Calculus, and Statistics. To access Tutor.com, click on <http://www.tamuct.edu/departments/academicsupport/tutoring.php>.

University Library

The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 250,000 eBooks and 82,000 journals, in addition to the 72,000 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at TAMUCT are available through our website to help students navigate these resources. On-campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available twenty-four hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place on Skype or in-person at the library. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the TAMUCT main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our homepage: <http://www.tamuct.edu/departments/library/index.php>.

The University Writing Center

The University Writing Center at Texas A&M University-Central Texas is a free workspace open to all TAMUCT students. The UWC is located in 416 Warrior Hall. The center is open 1pm-6pm Monday-Thursday during the summer semester. Students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Students may also arrange a one-on-one session with a trained and experienced writing tutor. Tutorials can be arranged by visiting the UWC. Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. Sessions typically last between 20-30 minutes. While tutors will not write, edit, or grade papers, they will help students develop more effective invention and revision strategies.

Technology Requirements & Support

Technology Requirements

This course will use the Canvas learning management system.

Logon to <https://tamuct.instructure.com/> to access the course.

All course materials will be posted to:

<http://rpubs.com/mroberts/350466>

Make sure to navigate to the website on a daily basis, as it will be updated regularly.

Students are required to use R/Rstudio for statistical analyses and data visualization.

Technology Support

For technology issues, students should contact Help Desk Central. 24 hours a day, 7 days a week:

Email: helpdesk@tamu.edu

Phone: (254) 519-5466

Web Chat: <http://hdc.tamu.edu>

When calling for support please let your support technician know you are a TAMUCT student.

For issues related to course content and requirements, contact your instructor.

Technology issues are not an excuse for missing a course requirement – make sure your computer is configured correctly and address issues well in advance of deadlines.

Your Professor...

What You Can Expect From Me

It is a great privilege to have the opportunity to work with you during this most exciting time of your educational career. I want to ensure your experience is as successful as possible. It is my hope that when the time comes for you to have your own classroom, you will have the skills necessary to make a lasting impact in the lives of your students. As such, I am available to you at all times during this semester. This course has been designed to offer you support in many areas of successful teaching, including the most problematic areas beginning teachers face.

I will:

- Be a resource to you if you need guidance at any time during educational experience.
- Provide feedback in a timely manner.
- Return e-mails and phone calls usually within 48 hours.
- Take writing, grammar, and spelling into consideration on all assignments.
- Treat each of you with the respect afforded a professional.