MATH 2330: Functions & Modeling
Fall 2017

Instructor: Dr. Kathryn Rhoads

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Office Hours: Tuesday & Thursday, 12:30 – 1:00pm or by appointment

Section Information: MATH 2330-001

Time and Place of Class Meetings: PKH 309

Description of Course Content: Students engage in explorations and lab activities designed to strengthen and expand their knowledge of the topics found in secondary mathematics. Students collect data and explore a variety of situations that can be modeled using linear, exponential, polynomial, and trigonometric functions. Activities are designed to have them take a second, deeper look at topics they should have been exposed to previously; illuminate the connections between secondary and college mathematics; illustrate good, as opposed to typically poor, sometimes counterproductive, uses of technology in teaching; illuminate the connections between various areas of mathematics; and engage them in serious (i.e., non-routine) problem solving, problem-based learning, and applications of mathematics. While there is some discussion of how the content relates to secondary mathematics instruction, the course primarily emphasizes mathematics content knowledge and content connections, as well as applications of the mathematics topics covered. This course is part of the UTeach program. Prerequisite: C or better in MATH 2425; C or better inSCIE 1101 or SCIE 1234 or concurrent enrollment.

Student Learning Outcomes: In revisiting secondary mathematics, prospective mathematics teachers are expected to:

- Deepen and broaden function-related mathematical content knowledge from school algebra to calculus by exploring relevant topics in an inquiry-based learning situation.
- Make connections between college mathematics and secondary school mathematics.
- Build preliminary knowledge of professional and state mathematics curriculum standards.
- Use reflective and collaborative learning, and develop a stronger sense of professionalism and leadership.
- Create efficient seekers of content knowledge.
- Explore and learn appropriate use of technology in the mathematics classroom.

Required Textbooks and Other Course Materials:

Optional Textbook: *Functions in Mathematics: Introductory Explorations for Secondary School Teachers,* M. Daniels & E. Armendariz, (ISBN-13: 978-1609271688)

Required Materials: Graphing Calculator and Binder(s) and paper for keeping class handouts and work

Optional Materials: Grid paper and colored pencils

Class Format: I will conduct the course in a seminar-style format with few lectures. I will normally act as a "moderator" while you (the students) present exercises and justifications to one another. I will answer appropriate questions and steer discussions into productive channels.
You will engage in explorations and lab activities designed to strengthen and expand your knowledge of topics grounded in secondary school mathematics. You will collect data and explore a variety of situations that can be modeled using linear, exponential, polynomial, and trigonometric functions. The activities are designed to take a second, deeper look at topics studied previously; illuminate the connections between secondary and college mathematics; illustrate good, as opposed to typically poor, sometimes counterproductive, uses of technology in teaching; illuminate the connections between various areas of mathematics; and engage you in non-routine problem solving, problem-based learning, and applications of mathematics. While there is some discussion of how the content relates to secondary mathematics instruction, the course primarily emphasizes mathematics content knowledge and content connections, as well as applications of the mathematics topics covered.

Grading:

Exam 1: 25%
Exam 2: 15%
Final Exam: 15%
Homework and Labs: 20%
Midterm Project: 10%
Journal and Portfolio: 10%
Attendance: 5%

Tests/Labs/Homework: There will be frequent homework assignments, labs, and exams to test your knowledge of the concepts covered in class. Tests and labs will be in class; homework is to be completed outside of class time.

- We will work on explorations in class almost every class meeting. You are expected to write up the explorations we work in class by the next class meeting. In general, I will not grade these explorations, but I will call students to the board to present work or provide explanations based upon these. Thus, failure to come to class with your write-ups will result in my lowering your participation grade by one point. I may determine preparedness by collecting all explorations on a particular day and checking for completion or by observing preparedness based upon your presentations.
- You will be expected to keep a journal and a portfolio of the explorations from class for each unit. The portfolio will consist of your written work on the explorations and occasional summaries of assigned readings. Each portfolio will be graded on a holistic grading rubric.
- There will be no make-up exams or make-up labs. For extenuating circumstances with documented evidence, options other than receiving a zero for the missed exam or lab will be considered.
- In general, late work will not be accepted. One half of the assigned points will be deducted for work that is submitted after the due date if there is a legitimate and documentable excuse.

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance.

Since the majority of work in this class relies upon group work done during class time, regular attendance is critical. You are expected to be in class, on time, each day. Students missing class for a University Event, religious reason, or other 'pre-scheduled' reason must contact the instructor prior to the event and discuss reasonable accommodations. Everyone begins with 100 attendance points. Two points will be *deducted* for each absence. If you contact the instructor prior to the beginning of class (and receive confirmation of receipt of message), only one point will be deducted for that day's absence. One point will be *deducted* for each tardy after the first. If you leave class early, or choose not to participate, points will be *deducted* accordingly.

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Course Schedule[1]:

Day		Date	Topic or Activity
1	UNIT 1 Functions and Patterns	24-Aug	Lesson 1: Solving Problems
2		29-Aug	Lesson 2: Qualitative Look at Graphical Representations; Pre-Test
3		31-Aug	Lesson 2: Qualitative Look at Graphical Representations
4		5-Sep	Lesson 3: Examples of real world relationships between quantities
5		7-Sep	Lesson 4: What is a function? Homework 1
6		12-Sep	Lesson 4: What is a function?
7		14-Sep	Lesson 5: Functions and Equations
8		19-Sep	Lesson 5: Functions and Equations
9		21-Sep	Lesson 6: A familiar function from a different point of view **Homework 1 DUE**
10		26-Sep	Lesson 7: Conic Sections; Homework 2
11		28-Sep	Lesson 8: Spring Mass Motion Lab
12		3-Oct	Lesson 9: Sequences and Triangular Differences
13		5-Oct	Lesson 10: Functions Arising from Patterns (Lesson 11: homework)
14		10-Oct	Lesson 12: Function Transformations **Homework 2 DUE**
15	UNIT 2 Modeling Using Regression & Matrices	12-Oct	Using Statistical Regression to fit a function to bivariate data
16		17-Oct	**EXAM 1; Portfolio on Unit 1 DUE**
17		19-Oct	Residual plots and application; Homework 3
18		24-Oct	Terminal Speed Lab
19		26-Oct	Using Matrices to find Models **Homework 3 DUE**
20		31-Oct	The Roller Coaster
		1-Nov	LAST DAY TO DROP CLASSES
21	UNIT 3 Exploring Functions in Other Systems	2-Nov	A Non-Standard Exploration of the Rate of Change of Functions **Midterm Project DUE**
22		7-Nov	**EXAM 2; Portfolio on Unit 2 DUE**
23		9-Nov	More Information Needed
24		14-Nov	Applications involving "more information"; Homework 4
25		16-Nov	Vector Lab
26		21-Nov	The Golf Shot
27		28-Nov	A Non-Standard Exploration of the Polar Coordinate System
28		30-Nov	The Geometry of Complex Numbers **Homework 4 DUE**
29		5-Dec	Complex Numbers in Polar Form and Euler Numbers
30		12-Dec	**FINAL EXAM 2:00 – 4:30p.m.; Portfolio on Unit 3 DUE**

[1] As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled. – Dr. Kathryn Rhoads

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in

the student's suspension or expulsion from the University. Additional information is available at https://www.uta.edu/conduct/.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit http://www.uta.edu/sfs.

Final Review Week: for semester-long courses**,** a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located down the stairs to the left as you exit the classroom. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Students should also be encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at https://mavalert.uta.edu/ or https://mavalert.uta.edu/register.php

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

University Tutorial & Supplemental Instruction (Ransom Hall 205): UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start

Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit www.uta.edu/utsi or call 817-272-2617.

The IDEAS Center (2nd Floor of Central Library) offers **FREE** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. http://library.uta.edu/academic-plaza