MAED 5352: Patterns and Algebra
Fall 2017

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Office Hours: By appointment

Section Information: MAED 5352-005

Course Prerequisites: EDUC 5305 and EDUC 5394

Time and Place of Class Meetings: Online

Description of Course Content: This course engages students in problem-based teaching and curriculum development to help children learn problem solving and critical thinking with an emphasis on patterns, relations, functions, algebraic reasoning, analysis, and technology. The course incorporates research shown effective in helping children develop necessary skills for algebraic reasoning as a foundation for higher level mathematics learning.

Student Learning Outcomes: The general structure of this course engages students in problem-based teaching and curriculum development to help children learn problem solving and critical thinking with an emphasis on patterns, relations, functions, algebraic reasoning, analysis, and technology. The course incorporates research shown effective in helping children develop necessary skills for algebraic reasoning as a foundation for higher level mathematics learning. The specific goals of this course are as follows:

1. Explore algebraic thinking, algebraic reasoning and algebra concepts to identify instructional strategies that help K-12 students learn in ways consistent with research-based foundations of teaching and learning mathematics.
2. Analyze mathematics content, lessons and curricula, and mathematics education literature (research articles, practitioner articles, Internet sites), to select and/or modify appropriate and meaningful learning experiences for K-12 students that are culturally relevant and cognitively demanding.
3. Collaborate with classmates to construct and present original and/or enhanced standards-based, inquiry-based (5E learning cycle) curricula for K-12 school students that will allow students to achieve deeper understanding and proficiencies in algebraic concepts.
4. Practice-teach, critique, reflect upon, and/or revise originally developed inquiry-based, standards-based curricula for K-12 students for the improvement of teaching effectiveness.
5. Incorporate culturally and socially responsive educational practices, topics and strategies in educational planning.
6. Review knowledge and skills associated with Algebra using a 5-E inquiry model.

Required Textbooks and Other Course Materials:
Articles and book chapters as assigned in each module and posted on Blackboard.

Supplemental Web Sources:

National Council of Teachers of Mathematics (2004) *Principles and Standards for School Mathematics*. Reston, VA: NCTM.
http://standards.nctm.org/document/appendix/numb.htm

National Council of Teachers of Mathematics. Reston, VA: NCTM. http://www.nctm.org/ (If you are not a member, you can join at the student rate and use my member number as a referral #4007154)

Teachers in Common Core States:
National Governors Association and Council of Chief State School Officers. (2011). *Common Core State Standards Initiative: Preparing America's Students for College & Career*.
http://www.corestandards.org/the-standards

Teachers in Texas:
Texas Essential Knowledge and Skills (TEKS), Math. Texas Education Agency, 2012. Subchapter A (elementary school): http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111a.html
Subchapter B (middle school):
http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111b.html
Subchapter C (high school):
http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111c.html
Subchapter D (other high school mathematics courses):
http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111d.html

Teachers Outside of Texas and Outside of a Common Core State:
Use your state curriculum standards for mathematics

Descriptions of major assignments:

1. **Module 1 Assignment: "Critique of a Culturally Relevant Cognitively Demanding [CRCD] Task"** In this assignment, you will choose one of the Algebra tasks given and use a rubric to analyze the task. This rubric is the result of a framework connecting higher level tasks with the perspectives of culturally relevant teaching, thus refining the descriptions of two of the categories presented by Smith and Stein as (a) *procedures with connections to concepts, meaning and understanding of mathematics, culture and community*, and (b) *doing mathematics for the purpose of becoming empowered intellectually, culturally, politically and socially.* These two renamed classifications are given for the purpose of having teachers of mathematics rethink the extent to which selected mathematics tasks challenge students to ask relevant questions of themselves and the world around them (Matthews, Jones, and Parker, 2013).

2. **Module 2 Quiz: "Patterns"** MAED 5352 students will answer content questions identifying and analyzing patterns.

3. **Module 3 Assignment: "CRCD Task over Patterns [developed in Module 2] or Variables, Unknowns, Expressions, Equations [developed in Module 3]"** In Module 2 Elaborate, you had the opportunity to bounce ideas with your colleagues on a CRCD task that had patterns as a content focus. In Module 3 Elaborate, you had the opportunity to bounce ideas with your colleagues on a CRCD task that had variables, unknowns, expressions or equations as a content focus. In this assignment, you will share the resulting task, standards connection, full solution, discussion of cognitive

demand, how to maintain cognitive demand, and the cultural relevance (or potential to be culturally relevant to students).

4. **Module 4 Quiz: "Variables, Unknowns, Slope, Functions"** MAED 5352 students will answer content questions utilizing variables and unknowns, identifying and analyzing slope and linear functions.

5. **Module 5 Assignment: "CRCD Task over Slope and Functions"** In Module 4 Elaborate, you had the opportunity to bounce ideas with your colleagues on a CRCD task that had slope and linear functions as a content focus. In Module 5 Elaborate, you had the opportunity to bounce ideas with your colleagues on a CRCD task that had nonlinear functions as a content focus. In this assignment, you will share the resulting task, standards connection, full solution, discussion of cognitive demand, how to maintain cognitive demand, and the cultural relevance (or potential to be culturally relevant to students).

6. **Module 6 Quiz: "Nonlinear Functions** MAED 5352 students will answer content questions identifying, analyzing, and applying nonlinear functions.

7. **Module 7 Assignment:** Using any of the activities you created during the course, you can post your lesson plan on the Discussion Board **(which was optional during module 6)** for your colleagues to critique. Then, you will make any needed revisions and implement ("try out") the task with at least three individuals (students, relatives, class, small group, etc.). (NOTE: The format of the lesson plan is what is useful *for you*. In this program, you have learned about 5-E and in MAED 5351 and MAED 5352 you learned about the TTLP format. Please use the format that is useful for you). For this assignment, you will be graded on the *implementation* and *your reflection* on the lesson – not the lesson plan itself. After you have written your lesson plan/cycle, you will write a case study (3-5 pages, double-spaced, *approximately*) describing an episode from the implementation of this task. This will not be a complete transcript of the activity, but it would be good to include some direct quotes from students and dialogue between the students, if possible. The episode needs to illustrate some aspect of children's mathematical thinking, critical mathematics and cognitive demand of task in its implementation, as well as your ability to reflect on that thinking, identify larger teaching issues raised for you by the episode you describe and/or maintaining the cognitive demand of the high level task. A full description of the assignment is provided in the Module. Remember, your case must touch on a mathematical topic involving patterns, algebra and/or algebraic thinking. You will submit the lesson plan along with your Case Study. ***However, only your case study will be graded.***

Professional Dispositions: Each student/candidate in the College of Education at UTA will be evaluated on Professional Dispositions by the faculty and staff in each professional education course per semester. These dispositions are identified as essential for a highly-qualified professional. Instructors and program directors will work with students/candidates rated as "unacceptable" in one or more stated criteria. The student/candidate will have an opportunity to develop a plan to remediate any digressions. If digression(s) are not, or cannot be successfully remediated as in the case of an egregious digression, a determination will be made by Committee on continuation or dismissal from the College of Education.

The College of Education Conceptual Framework serves as a guide for our professional education programs. It highlights our commitment to excellence across courses and clinical experiences and reflects current research and alignment to professional standards. This document describes how we are dedicated to the development of highly skilled and ethical education professionals who are also intellectual and educational leaders. The UTA College of Education Conceptual Framework may be found at this link:
http://www.uta.edu/coed/about/conceptual-framework.php

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. As the instructor of this section, I will take attendance based on your regular, weekly participation in the course. However, while UTA 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." UTA 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.

Assignments. Since this course is online, it is expected that all students will access the learning modules as required and complete all activities as directed in the module, which includes journal reflections, discussions, and assignments. Activities are to be completed and submitted *in Blackboard* by the posted deadline. Do not send ANY reflections, discussions or assignments via email. If you are having trouble submitting in Blackboard, email your Instructor *and* Instructional Associate to notify them of the issue, but all assignments and activities MUST be submitted via Blackboard. Emailed assignments ***will not*** be graded. The Sunday of Week 6, students can submit ONE assignment (from Module 1 through Module 5) to be re-graded for a higher grade if they earned a grade lower than a 90. The highest possible grade on the resubmission will be 85.

Late Work. This is a 7-week course, so late work is strongly discouraged on any activity (which also includes journal reflections and discussion boards). Also, any assignment or post that is sent via email will not be graded and may be counted as late (see above). Please learn how to submit via Blackboard prior to the deadline and email your Instructor and Instructional Associate to notify them of any technical issues with submitting (this does not automatically make your assignment exempt from being counted as late). Any assignment that is late (submitted after the 11:59 p.m. deadline on the due date) will receive a **15% deduction** if it is one day late, a **25% deduction** if it is 2-3 days late and will not be accepted beyond 4 days late, regardless of the reason. *This includes submitting a wrong assignment or submitting in the wrong location, so make sure you submit your correct assignment in the appropriate location in Blackboard*. If it is late due to a technical difficulty, please email verification of such difficulty (i.e., screenshot of error message; email from tech support documenting difficulty, etc.) to the Instructor *and* your assigned Instructional Associate, however, this does not automatically make your assignment exempt from being counted as late.

Grading: Students in this course will engage in and complete three distinct types of *assessment activities* that will be used to measure the attainment of course concepts. These assessment activities are *Reflection Journals*, *Assignments,* and *Discussions*. An overview of these assessment activities are presented below. Detailed instructions and scoring rubrics for all assignments are included in the module in Blackboard for that assessment activity. The summary of grade distribution for assignments, discussions, and reflections is as follows:

Reflection Journals: 15%
Assignments: 70%
Discussions: 15%
Total Grade: 100%

Grade Calculation

The points earned will be transformed to percentages. The grading system as per UTA policy is as follows:

A = 90 – 100
B = 80 – 89
C = 70 – 79
D = 60 – 69
F = Below 60

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: UTA 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 UTA 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 UTA courses are expected to adhere to the UTA Honor Code:

> *I pledge, on my honor, to uphold UTA'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.*

UTA 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: UTA 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. UTA'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.

The English Writing Center (411LIBR): The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at https://uta.mywconline.com. Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see www.uta.edu/owl for detailed information on all our programs and services.

Library Resources library.uta.edu

- **Research or General Library Help**
  - Academic Plaza Consultation Services library.uta.edu/academic-plaza
  - Ask Us ask.uta.edu/
  - Library Tutorials library.uta.edu/how-to
  - Subject and Course Research Guides libguides.uta.edu
  - Librarians by Subject library.uta.edu/subject-librarians
  - Research Coaches http://libguides.uta.edu/researchcoach
- **Resources**
  - A to Z List of Library Databases libguides.uta.edu/az.php
  - Course Reserves pulse.uta.edu/vwebv/enterCourseReserve.do
  - FabLab fablab.uta.edu/
  - Scholarly Communications (info about digital humanities, data management, data visualization, copyright, open educational resources, open access publishing, and more) http://library.uta.edu/scholcomm
  - Special Collections library.uta.edu/special-collections
  - Study Room Reservations openroom.uta.edu/
- **Teaching & Learning Services for Faculty**
  - Copyright Consultation library-sc@listserv.uta.edu
  - Course Research Guide Development, Andy Herzog amherzog@uta.edu or your subject librarian
  - Data Visualization Instruction, Peace Ossom-Williamson peace@uta.edu
  - Digital Humanities Instruction, Rafia Mirza rafia@uta.edu
  - Graduate Student Research Skills Instruction, Andy Herzog amherzog@uta.edu or your subject librarian
  - Project or Problem-Based Instruction, Gretchen Trkay gtrkay@uta.edu
- **OTHER RESOURCES**
  - Environmental Health & Safety (http://www.uta.edu/ehsafety)
  - 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

Course Outcomes and Performance Measurement

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 in this course.
– Dr. Yolanda A. Parker.

Course Objective(s)	Module Number and Objective(s)	Activity (Reflection Journal, Group Discussion Board or Module Assignment)
1	**Module 1** Define Algebra in your own words. Use resources to create a definition or description of Algebra. Explore and analyze the similarities and differences in how Algebra is taught and learned in grades Pre-K through 8th grade as compared to formal algebra.	Module 1 Engage – Reflection Journal
2, 4, 5	Identify cultural relevance	Module 1 Elaborate – Discussion Board
2, 3, 5, 6	Identify cultural relevance	Module 1 Evaluate – Assignment "Introduction to Culturally Relevant Cognitively Demanding Tasks"
1, 6	**Module 2** Use deductive reasoning to analyze patterns in puzzles, real-life situations, and other contexts to make generalizations.	Module 2 Engage – Reflection Journal
1, 6	Connect a relatively new mathematics, fractals, to elementary mathematics	Module 2 Explore and Explain – Discussion Board
3, 5	Develop activities that allow students to reason algebraically, particularly with patterns and sequences. Create problems that require students to analyze numeric and geometric patterns	Module 2 Elaborate – Collaboration Discussion Board

Course Objective(s)	Module Number and Objective(s)	Activity (Reflection Journal, Group Discussion Board or Module Assignment)
1, 6	Use deductive reasoning to analyze patterns in puzzles, real-life situations, and other contexts to make generalizations.	Module 2 Evaluate – Quiz over Patterns
1, 2, 6	**Module 3** Explore problem situations that involve solving equations	Module 3 Engage – Reflection Journal
2	Discuss and develop effective strategies for students to translate words and situations into equations. Explore problem situations that involve solving equations Explore and discuss the concept of variable/unknown	Module 3 Explore and Explain – Discussion Board
2, 3, 5	Design and discuss tasks that are cognitively demanding and utilize state/national standards at varying grade levels. Collaborate with classmates on enhancing existing tasks across grade levels and incorporate cultural relevance/responsiveness.	Module 3 Elaborate – Collaboration Discussion Board
2, 3, 5	Design a culturally relevant cognitively demanding task that utilizes state/national standards at varying grade levels.	Module 3 Evaluate – Assignment (CRCD Task developed in Module 2 or Module 3)
1, 2	**Module 4** Explore and discuss strategies for teaching the following concepts to K-12 students: slope and rate of change; functions	Module 4 Engage – Reflection Journal
1, 4, 5, 6	Explore and discuss strategies for teaching rate of change	Module 4 Explore and Explain – Discussion Board

Course Objective(s)	Module Number and Objective(s)	Activity (Reflection Journal, Group Discussion Board or Module Assignment)
2, 3, 5	Design and discuss lessons/activities that are cognitively demanding and utilize state/national standards at varying grade levels. Collaborate with classmates on enhancing existing lessons/activities across grade levels and incorporate cultural relevance/responsiveness.	Module 4 Elaborate – Collaboration Discussion Board
1, 6	Demonstrate knowledge and skills in contexts that involve algebraic concepts	Module 4 Evaluate – Quiz over K-12 content from Modules 3 and 4 (variables, unknowns, expressions, equations, slope, rate of change, linear functions)
1, 2	**Module 5** Explore and discuss strategies for teaching nonlinear functions	Module 5 Engage – Reflection Journal
2, 3, 4, 5	Explore and discuss strategies for teaching nonlinear functions	Module 5 Explore and Explain – Discussion Board
2, 3, 5	Design and discuss tasks that are cognitively demanding and utilize state/national standards at varying grade levels. Collaborate with classmates on enhancing existing tasks across grade levels and incorporate cultural relevance/responsiveness.	Module 5 Elaborate – Collaboration Discussion Board
2, 3, 5	Design a culturally relevant cognitively demanding task that utilizes state/national standards at varying grade levels.	Module 5 Evaluate – Assignment (CRCD task developed in Module 4 or Module 5)
1, 2	**Module 6** Explore and discuss strategies for teaching nonlinear functions	Module 6 Engage – Reflection Journal
1, 2 , 4, 5	Explore and discuss strategies for teaching nonlinear functions	Module 6 Explore and Explain – Discussion Board

Course Objective(s)	Module Number and Objective(s)	Activity (Reflection Journal, Group Discussion Board or Module Assignment)
1, 6	Explore and discuss nonlinear patterns and functions	Module 6 Elaborate – Reflection Journal
OPTIONAL 1, 3, 5, 6	OPTIONAL Analyze culturally relevant cognitively demanding lesson plans developed by MAED 5352 students that utilize state/national standards at varying grade levels. Design and discuss tasks that are cognitively demanding and utilize state/national standards at varying grade levels. Collaborate with classmates on enhancing existing tasks across grade levels and incorporate cultural relevance/responsiveness.	OPTIONAL Module 6 Elaborate – Discussion Board (Critique lesson plans to be implemented for the Module 7 Case Study assignment)
1, 6	Demonstrate knowledge and skills in contexts that involve nonlinear functions	Module 6 Evaluate – Quiz over Nonlinear Functions
1, 2	**Module 7** Vertically align algebraic concepts across K-12 Determine how algebraic thinking/reasoning appears in K-12 classrooms	Module 7 Engage – Reflection Journal
1, 2, 3	Vertically align algebraic concepts across K-12 Determine how algebraic thinking/reasoning appears in K-12 classrooms	Module 7 Elaborate – Discussion Board

Course Objective(s)	Module Number and Objective(s)	Activity (Reflection Journal, Group Discussion Board or Module Assignment)
1, 2, 4, 5	Design a culturally relevant cognitively demanding task that utilizes state/national standards at varying grade levels. Reflect on maintaining the cognitive demand during the implementation of a CRCD task/lesson	Module 7 Evaluate – Assignment (Case Study)

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 in this course.
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Emergency Phone Numbers: In case of an on-campus emergency, call the UTA Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381