

**EDUC 5322-110, CRN 80565, Teaching Mathematics and Science**

Fall 2018 rev. 08.01.2018

Texas A&M University-Central Texas

**INSTRUCTOR AND CONTACT INFORMATION**

**Instructor:** Carl Juenke, PhD

**Office:** WH 322-P

**Phone:** 254-519-5795

**Email:** Email via Canvas only

**Office Hours:**

**M** (2:00-4:00 p.m.);

**T** (11:00 a.m. – 4:00 p.m.);

**Th** (8:00 a.m. – 1:00 p.m.);

Also by appointment

**Mode of instruction and course access:**

This course is a field-based practicum course involving some face-to-face instruction. However, the majority of your learning will take place during clinical teaching placement. This course utilizes TAMUCT Blackboard Learn system (<https://tamuct.blackboard.com>) with access by your Blackboard username and password.

This course uses the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com>].

**Student-instructor interaction:**

As this course is critical in the growth and development of you as a teacher, I am readily available to you. You can reach me at any time during my office hours, by email, or by phone. If you would like to request a conference, please email me and I will get back to you with available times. If I am unavailable and you need to speak with someone about your placement or in an emergency, please call (254) 519-8737.

**911 Cellular:**

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

911Cellular 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 911Cellular through their myCT email account.

Connect at [911Cellular](https://portal.publicsafetycloud.net/Texas-AM-Central/alert-management) [<https://portal.publicsafetycloud.net/Texas-AM-Central/alert-management>] to change where you receive your alerts or to opt out. By staying enrolled in 911Cellular, university officials can quickly pass on safety-related information, regardless of your location.

## **COURSE INFORMATION**

**Course Overview and description:** This course is an advanced study of methods and materials for the teaching of math and science. Emphasis will be on helping teachers become more effective in teaching math and science by developing questions, investigations, speculations, and explorations that reflect not only the content of each area of study, but the process involved in learning.

**Course Objective:** The objective of the course is to provide teachers with information concerning the current basic concepts and skills and educational methodologies in mathematics and science content areas. Students will explore the different theories of learning and the unique developmental characteristics of PreK-5 children and apply this knowledge to the teaching of mathematics and science.

### **Course Understandings**

- The educator will understand different theories of learning and child development as they apply to teaching mathematics and science.
- The educator will analyze professional readings related to current trends in the theory and practice of mathematics and science education.
  - The educator will apply content knowledge and pedagogical knowledge to the creation and demonstration of lessons that teach basic mathematics and science skills and concepts to PreK-4 children.
- The educator will understand and identify common misconceptions and error patterns related to learning science and mathematics and apply strategies to correct students' understandings.

### **Student Learning Outcomes:**

#### **Knowledge Outcomes**

- Examine different theories of learning and child development as they apply to teaching mathematics and science.
- Analyze professional readings concerning mathematics and science concepts and skills, instruction, assessments, misconceptions, and/or standards.
- The educator will understand and identify common misconceptions and error patterns related to learning science and mathematics and apply strategies to correct students' understandings. Skills Outcomes
- Use a variety of instructional models and strategies to create lessons in mathematics and science that teach basic mathematics and science skills and concepts to PreK-5 children.
- Demonstrate appropriate use of a selected instructional model.

#### **Competency Goals 3 Standard 3--Content Knowledge and Expertise.**

Teachers exhibit a comprehensive understanding of their content, discipline, and related pedagogy as demonstrated through the quality of the design and execution of lessons and their ability to match objectives and activities to relevant state standards.

**Standard 6--Professional Practices and Responsibilities.** Teachers consistently hold themselves to a high standard for individual development, pursue leadership opportunities, collaborate with other educational professionals, communicate regularly with stakeholders, maintain professional relationships, comply with all campus and school district policies, and conduct themselves ethically and with integrity.

## **PEDAGOGY AND PROFESSIONAL RESPONSIBILITIES STANDARDS (PPR) (EC-GRADE 12)**

Standard I. The teacher designs instruction appropriate for all students that reflects an understanding of relevant content and is based on continuous and appropriate assessment. InTASC standards The Learner and Learning

- Standard 1: Learner Development—The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.
- Standard 2: Learning Differences—The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards. Content
- Standard 4: Content Knowledge—The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content. • Standard 5: Application of Content—The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues. Instructional Practice
- Standard 6: Assessment—The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.
- Standard 7: Planning for Instruction—The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context. •
- Standard 8: Instructional Strategies—The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways. 4 Professional Responsibility
- Standard 9: Professional Learning and Ethical Practice—The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

### **Required Reading and Textbook(s): Required:**

- Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching* (1st ed.). Jossey-Bass. ISBN-10: 0470894520, ISBN-13: 978-0470894521
- Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L. & Empson, S. B. (2015). *Children's mathematics: Cognitively guided instruction* (2<sup>nd</sup> ed.). Portsmouth, NH: Heinemann.
- Charlesworth, R. (2015). *Math and Science for Young Children, 8th Edition*. Cengage Learning ISBN-13: 978-1305088955, ISBN-10: 1305088956

## **COURSE REQUIREMENTS**

**Number Sense Activity:** Students will use the Concrete-Representational-Abstract approach to demonstrate and model how to understand and solve addition, subtraction, multiplication and division problems (100 pts.).

**Growth Mindset Project:** Students will work with a partner to develop and present an assessment for a growth mindset in mathematics (100 pts.).

**Teaching Mathematics for a Growth Mindset:** Students will work in small groups to participate in activities and practice strategies that promote a mathematical growth mindset. Students will utilize the C-R-A approach with these activities (150 pts.).

**Addition and Subtraction Problem Types:** Students will work with a partner to model and demonstrate a classification scheme for addition and subtraction problems. For each classification scheme, students will create mathematics problems to use with their explanation of the classification scheme. Students will also identify and utilize an appropriate mathematics manipulative to represent and/or explain their mathematics problem(s) (200 pts.).

**Understanding Student Misconceptions:** Students will consider multiple samples of young children’s attempts at solving addition/subtraction and multiplication/division mathematics problems. Videos of some young students will also be presented with the young student describing their solution strategy. Students will identify young student misconceptions and/or invented algorithms and develop a strategy for re-directing the young student to correctly solve the mathematics problem (200 pts.).

**Math and Science Presentations:** Students will develop and present a mini-lesson for one math concept and one science concept. Students are expected to incorporate and model multiple strategies addressed during the 16-week course. (250 pts.)

**Grading Criteria Rubric and Conversion**

<b>Assignment</b>	<b>Points</b>
<b>Number Sense Activity</b>	100 pts.
<b>Growth Mindset Project</b>	100 pts.
<b>Teaching Mathematics for a Growth Mindset</b>	150 pts.
<b>Addition and Subtraction Problem Types</b>	200 pts.
<b>Understanding Student Misconceptions</b>	200 pts.
<b>Math and Science Presentations</b>	250 pts.
<b>Total</b>	<b>1000 pts.</b>

**Grading Criteria Rubric and Conversion**

A	(1000 – 900)	exceptional demonstration and deep coherent understanding
B	(899 – 800)	proficient understanding
C	(799 – 700)	acceptable understanding in most areas
D	(699 – 600)	developing understanding with some critical deficiencies
F	(599 – 0)	unsatisfactory understanding with significant deficiencies

## Posting of Grades

Final grades will be posted to Blackboard Learn after completion of course requirements.

## COURSE OUTLINE AND CALENDAR

Complete Course Calendar		Readings/Resources		
Week	Topic	Carpenter	Boaler	Charlesworth
1	Syllabus and Course Overview (Syllabus and Textbooks)			
2	Number Sense	Ch. 1		
3	Number Sense Activities			
4	Growth Mindset		Ch. 4 & 7	
5	Teaching Mathematics for a Growth Mindset		Ch. 9	
6	Using Cognitively Guided Instruction	Ch. 5		
7	Addition & Subtraction Problem Types	Ch. 2 & 3		
8	Addition & Subtraction Problem Types			
9	Understanding Student Misconceptions	Ch. 9, 10 & 11		
10	Student Misconceptions (cont'd.)			
11	Teaching Science through Inquiry			Selected Chapters
12	Teaching Science through Inquiry			
13	Math and Science Presentations			
14	Math and Science Presentations			
15	Observing Student Thinking	Videos		
16	Final Demonstrations			

## Important University Dates:

FALL 2018

August 24, 2018	Deadline for Tuition and Fee Payments (16- & First 8-Week Classes)
August 27, 2018	Add, Drop, and Late Registration Begins for 16- and First 8-Week Classes. \$25 fee assessed for late registrants.
August 27, 2018	Classes Begin for Fall Semester
August 29, 2018	Deadline for Add, Drop, and Late Registration for 16- and First 8-Week Classes
September 3, 2018	Labor Day
September 4, 2018	Deadline to Drop First 8-Week Classes with No Record
September 12, 2018	Deadline to drop 16-Week Classes with No Record
October 1, 2018	Deadline for Teacher Education and Professional Certification Applications (i.e. Principal, Reading Specialist, etc.)
October 5, 2018	Deadline to Drop First 8-Week Classes with a Quit (Q) or Withdraw (W)
October 5, 2018	Deadline for Graduation Application for Ceremony Participation
October 5, 2018	Student End of Course Survey Opens (First 8-Week Classes)

October 12, 2018	Deadline for Fall Admissions Applications
October 15, 2018	Deadline for Clinical Teaching Applications
October 19, 2018	Classes End for First 8-Week Session
October 19, 2018	Deadline for Tuition and Fee Payments (Second 8-Week Classes)
October 19, 2018	Deadline to Withdraw from University for First 8-Week Classes (WF)
October 22, 2018	Add, Drop, and Late Registration Begins for Second 8-Week Classes. \$25 fee assessed for late registrants
October 22, 2018	Classes Begin for Second 8-Week Session
October 22, 2018	Student End of Course Survey Closes (First 8-Week Classes)
October 23, 2018	Deadline for Faculty Submission of First 8-Week Class Final Grades (due by 3pm)
October 24, 2018	Deadline for Add, Drop, and Late Registration for Second 8-Week Classes
October 29, 2018	Deadline to Drop Second 8-Week Classes with No Record
November 1, 2018	Deadline for GRE/GMAT Scores to Office of Graduate Studies
November 9, 2018	Deadline to Drop 16-Week Classes with a Quit (Q) or Withdraw (W)
November 12, 2018	Veterans Day (Observed) - No Class
November 16, 2018	Deadline for Final Committee-Edited Theses with Committee Approval Signatures to Office of Graduate Studies for Fall Semester
November 22, 2018	Thanksgiving
November 23, 2018	Thanksgiving
November 30, 2018	Deadline to Drop Second 8-Week Classes with a Quit (Q) or Withdraw (W)
December 1, 2018	Student End of Course Survey Opens (16- and Second 8-Week Classes)
December 14, 2018	Commencement Ceremony Bell County Expo Center 7:00 p.m.
December 14, 2018	Deadline for Applications for \$1,000 Tuition Rebate for Fall Graduation (5pm)
December 14, 2018	Deadline for Fall Degree Conferral Applications to the Registrar's Office. \$20 Late Application Fee.
December 14, 2018	Deadline to Withdraw from University for 16- and Second 8-Week Classes
December 14, 2018	Fall Semester Ends
December 17, 2018	Student End of Course Survey Closes (16- and Second 8-Week Classes)
December 18, 2018	Deadline for Faculty Submission of 16-Week and Second 8-Week Final Class Grades (due by 3pm)
December 18, 2018	Deadline for Theses to Clear Thesis Office for Fall Semester
December 24, 2018 – January 1, 2019	Winter Break

## TECHNOLOGY REQUIREMENTS AND SUPPORT

### Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. Logon to A&M-Central Texas Canvas [<https://tamuct.instructure.com>].

Username: Your MyCT username (xx123 or everything before the "@" in your MyCT e-mail address)

Password: Your MyCT password

### Canvas Support

Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with

Canvas. You can select “Chat with Canvas Support,” submit a support request through “Report a Problem,” or call the Canvas support line: 1-844-757-0953.

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

### **Other Technology Support**

For log-in problems, students should contact Help Desk Central.

24 hours a day, 7 days a week:

Email: [helpdesk@tamu.edu](mailto:helpdesk@tamu.edu)

Phone: (254) 519-5466

[Web Chat](http://hdc.tamu.edu): [http://hdc.tamu.edu]

*Please let the support technician know you are an A&M-Central Texas student.*

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## **UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES**

### **Drop Policy.**

If you discover that you need to drop this class, you must complete a [Drop Request Form](https://www.tamuct.edu/registrar/docs/Drop_Request_Form.pdf) [https://www.tamuct.edu/registrar/docs/Drop\_Request\_Form.pdf].

Professors cannot drop students; this is always the responsibility of the student. The Registrar’s Office will provide a deadline on the Academic Calendar for which the form must be completed, signed and returned. Once you return the signed form to the Registrar’s Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar’s Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

### **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.

**Academic Accommodations.**

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 a barrier-free education. The Office of Access and Inclusion is responsible for ensuring that students with a disability receive equal access to the university's programs, services and activities. If you believe you have a disability requiring reasonable accommodations please contact the Office of Access and Inclusion at (254) 501-5831. Any information you provide is private and confidential and will be treated as such.

For more information please visit our [Access & Inclusion](https://www.tamuct.edu/student-affairs/access-inclusion.html) web page [https://www.tamuct.edu/student-affairs/access-inclusion.html].

**Important information for Pregnant and/or Parenting Students.**

Texas A&M University-Central Texas supports students who are pregnant and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit the [Student Affairs](https://www.tamuct.edu/student-affairs/index.html) web page [https://www.tamuct.edu/student-affairs/index.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines online](http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf), please visit the website [http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender—including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also contact the University's Title IX Coordinator.

**Tutoring.**

Tutoring is available to all A&M-Central Texas students, both on-campus and online. Subjects tutored on campus include Accounting, Advanced Math, Biology, Finance, Statistics, Mathematics, and Study Skills. Tutors are available at the Tutoring Center in Warrior Hall, Suite 111.

If you have a question regarding tutor schedules, need to schedule a tutoring session, are interested in becoming a tutor, or have any other question, contact Academic Support Programs at (254) 519-5796, or by emailing Dr. DeEadra Albert-Green at [deeadra.albertgreen@tamuct.edu](mailto:deeadra.albertgreen@tamuct.edu).

Chat live with a tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive FREE

online tutoring and writing support. This tool provides tutoring in over 40 subject areas. Access Tutor.com through Canvas.

### **University Writing Center.**

Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (TAMUCT) is a free workspace open to all TAMUCT students from 10:00 a.m.-5:00 p.m. Monday thru Thursday with satellite hours in the University Library Monday thru Thursday from 6:00-9:00 p.m. This semester, the UWC is also offering online only hours from 12:00-3:00 p.m. on Saturdays.

Students may arrange a one-on-one session with a trained and experienced writing tutor by visiting the UWC during normal operating hours (both half-hour and hour sessions are available) or by making an appointment via [WCOOnline](https://tamuct.mywconline.com/) at [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at [bruce.bowles@tamuct.edu](mailto:bruce.bowles@tamuct.edu) for any assistance needed with scheduling.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, 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. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

If you have any questions about the UWC, please do not hesitate to contact Dr. Bruce Bowles Jr. at [bruce.bowles@tamuct.edu](mailto:bruce.bowles@tamuct.edu).

### **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 85,000 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 A&M-Central Texas 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 24 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 A&M-Central Texas 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 [Library website](http://tamuct.libguides.com/index) [http://tamuct.libguides.com/index].

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#### **OPTIONAL POLICY STATEMENTS:**

##### **A Note about Sexual Violence at A&M-Central Texas**

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the [Title IX webpage](https://www.tamuct.edu/departments/compliance/titleix.php) [https://www.tamuct.edu/departments/compliance/titleix.php].

#### **INSTRUCTOR POLICIES.**

##### **Copyright Notice.**

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.

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