

2019–20 Undergraduate Program Review

Department of Mathematics

March 15, 2020

University Mission and Priorities (department-level responses)

1. How do your programs fit with the university mission to educate students for Christian service and leadership throughout the world?

As the language in which nature speaks to us, mathematics has been a vital ingredient in physics and chemistry and the intellectual fabrics of a broad range of disciplines, increasing its impact on such diverse areas as space science, management and the social sciences. More recently, the fundamental role of mathematics has been recognized in biology and medicine. Moreover, it has long been an essential component of the school and college curriculum, especially for the preparation of scientists and engineers. Mathematics is the foundation of our technological society and is a growing, changing discipline with new results constantly being discovered. The computer has extended the reach and power of mathematics, making it even more crucial that young people be solidly grounded in the subject. Mathematics is a crucial component of our culture and a discipline essential to the well-being of American science and technology, as well as to economic strength, industrial competitiveness and national defense.

https://catalog.acu.edu/preview_entity.php?catoid=8&ent_oid=380

2. What connections do you see between your programs and the university's current strategic plan, available at blogs.acu.edu/strategicplan/?

The actuarial science concentration of the MATH degree plan (MATH-MASC) is a distinctive program within the department. When this concentration was developed, ACU was only one of a handful of universities in Texas with an actuarial science program. The Society of Actuaries currently lists nine universities in Texas with an actuarial science program. <https://www.soa.org/institutions/>

In addition, faculty in the department have been at the forefront on innovative delivery. Four faculty members have been part of three 20/20 Grants in the department to develop innovative approaches and delivery for both majors courses and general education courses.

Our mathematics teaching majors (MATT) will participate in experiential learning in MATH 418 Professional Development Experience in Mathematics. Under the supervision of a mathematics faculty member, students in this course will analyze data to identify deficiencies in student understanding, prepare classroom lessons to address an identified deficiency, teach one of the prepared lessons, and reflect and review on the student learning observed.

Enrollment and Completions (department-level responses)

The following data will be provided to you in mid-September for use in this section:

- Number of students enrolled in your programs (Fall, 12th day) for last five years

Major	Program	Fall 2019	Fall 2018	Fall 2017	Fall 2016	Fall 2015
MATH	BA MATH	2	0	0	0	1
MATH	BS MATH	21	23	25	20	18
MATM	BS EDUC				1	0
MATM	BS MATM				0	1
MATT	BS EDUC	6	9	11	11	6
MATT	BS MATT	5	6	4	1	7
Total		34	38	40	33	33

- Number of student completions of your programs for last five years

Major	Program	AY 2019	AY 2018	AY 2017	AY 2016	AY 2015
MATH	BA MATH	0	0	0	0	1
MATH	BS MATH	4	7	5	0	7
MATM	BS MATM				1	0
MATT	BS MATT	4	0	1	6	5
Total		8	7	6	7	13

3. Based on the provided numbers, describe your efforts to:

- (a) Promote student interest during prospective student visits.

The department has a faculty member meet with prospective students to talk about the department and to answer any questions. We also give prospective students a folder that has information about the majors. One page in this folder is a summary of our degree plans and provides for a quick comparison of the requirements for each major. The department also tries to follow up with the prospective student after the visit. The department is also learning how to use Slate so that we can reach out to prospective students.

- (b) Provide programs that compare competitively with other universities.

The department believes its programs compare favorably to programs at other universities.

One measure of comparison is the ETS Major Field Test in Mathematics. We require all of our majors to take this test during their capstone experience. Actuarial Science (MATH-MASC) and Mathematics-Teaching majors (MATT) do not have the broad background of upper level mathematics courses that adequately prepares them for this exam. However, they still often do relatively well.

The following table lists the percentile scores of our majors on the ETS Major Field Test in Mathematics for the past five years. Our acceptable target result is for MATH majors to score at the 60th percentile or higher and for other majors to score at the 50th percentile or higher. For MATH majors (BA and BS), we are doing well; for MASC majors, we are doing OK; and for MATT majors, they tend to struggle.

Major	Percentile Scores				
	Fall 2019	Fall 2018	Fall 2017	Fall 2016	Fall 2015
MATH	68, 86, 96	20, 96	62, 87, 92	17, 74	69
MASC	42, 63, 77	50, 80	32, 40, 55, 84, 89	40, 56, 63	
MATT	19, 19	35, 35, 50, 50		95	3, 7, 41, 41, 41, 63
MATM					56

Another measure that we can use to compare our Mathematics Teaching program to other universities programs is how our MATT majors do on the Grades 7–12 Mathematics TExES. This is the certification exam that students are required to pass before they may begin their clinical teaching experience. The results of our majors on their first attempt on this exam are given in the following table:

Certification Exam Scores					
2019	2018	2017	2016	2015	
261	251, 264, 265, 270		293	239, 254, 257, 268, 278, 280	

Of these scores, only one was not passing (239). Our Mathematics-Teaching majors are being well prepared. According to the TEA, the pass rate for the Grades 7–12 Mathematics TExES is 95% in 2019 and 96% in 2018. There were 393 and 389 students in Texas in 2018 and 2019, respectively, that took this certification exam.

<https://tea4avcastro.tea.state.tx.us/ELQ/educatorprepdashboard/v11/indicator1b.html>

- (c) Retain students within your programs once they declare your major.

I do not understand the difference between this prompt and the next one. To retain students we must support their progress. If we support their progress, that helps retain them within the department.

At the end of each semester, the department tries to send a letter to every major to commend them on their semester or to encourage them by saying that they can still be successful the following semester. Also after midterm grades are submitted, the department tries to email every major encouraging them to complete the semester successfully. If a student is struggling in a course, then the email recommends that they visit with the instructor of that course.

The department also encourages majors to visit with their department mentors. Unfortunately, this rarely happens. The department can email students and mentors can email students, but most students do not meet with faculty mentors.

To help majors academically, the department provides tutoring for students in the Precalculus/Calculus sequences. This tutoring is offered on Tuesday and Thursday evenings each week of the semester and is open to all students.

The department is considering the creation of a first-year seminar course for majors. Entering majors in the department do not have a single course that they all take their first year. Every year we have entering students who begin in Precalculus I, Precalculus II, Calculus I, Calculus II, or Calculus III. This means our entering cohort of students are unable to assimilate into the department and build meaningful relationships with each other. This first-year seminar has the potential of helping the department retain and grow our majors.

The department also has social events throughout the year to encourage and support students. We begin the fall semester with an evening at Prime Time Entertainment where all majors and faculty can interact outside of the formal classroom and office environments. Other events through the year include a game night in the fall, a cookout in the spring, and department dinner in the spring. On Mondays, we provide snacks for majors that we put in the mathematics student room.

(d) Support progress of current students toward degree completion.

See response to previous prompt.

4. Name several trends present in your discipline and higher education that may affect enrollment in your programs, and please cite relevant statistics and sources. Based on these trends, what changes do you anticipate in enrollment in the next five years? Note: a department-level response is sufficient, although departments with multiple programs will likely discuss some specifically.

For the BA Mathematics (MATH) and BS Mathematics (MATH) majors, the U.S. Bureau of Labor Statistics is projecting 26% growth in math occupations from 2018 to 2028. This growth rate is much faster than the average for all occupations. For specific areas of mathematics, employment for actuaries is projected to grow 20% from 2018 to 2028, employment for operations research analysts is expected to 26% from 2018 to 2028, and employment of mathematicians and statisticians is projected to grow 30% from 2018 to 2028. <https://www.bls.gov/ooh/math/home.htm>

For the Mathematics for Grades 7–12 Teacher Certification (MATT) major, secondary mathematics teaching is recognized by the state and federal government as an area that has a shortage of teachers. The U.S. Department of Education approved the 2018–19 teacher shortage areas submitted by the Texas Education Agency. The approved state-level shortage areas are

- Bilingual/English as a Second Language – Elementary and Secondary Levels
- Special Education – Elementary and Secondary Levels
- Career and Technical Education – Secondary Levels (including Technology Applications and Computer Science)
- Mathematics – Secondary Levels

https://tea.texas.gov/About_TEA/News_and_Multimedia/Correspondence/TAA_Letters/018-2019_Teacher_Shortage_Areas_and_Loan_Forgiveness_Programs

In February 2020, the department learned that Mathematics (secondary level) is still considered a teacher shortage area by the U.S. Department of Education for college-load forgiveness programs.

<https://tea.texas.gov/about-tea/news-and-multimedia/correspondence/taa-letters/2020-2021-teacher-shortage-areas-and-loan-forgiveness-programs>

Curriculum and Assessment (program-level responses)

5. Provide the date of the last major curriculum revision of each of your majors/programs.

BA Mathematics (MATH): 2006–07

BS Mathematics (MATH): 2006–07

BS Mathematics (MATH – MASC): 2016–17

Mathematics for Grades 7–12 Teacher Certification (MATT): 2015–16

When our professional organizations make changes to recommended curriculum, the department reviews the new guidelines and proposes new changes to our degree plans. These changes are often minor changes. We also solicit recommendations from our visiting committee.

6. Provide the current program outcomes that identify the competencies of your students upon graduation.

Below is a list of program objectives for majors in the department. All majors are expected to demonstrate competency in the following program objectives:

2A1, 2A2, 2A3, 2A4, 2A6, 2A8, 2B1, 2B2, 2E1, 2F1, 2F2, 2G1, 2G2, 2L1, and 2L2

Actuarial science majors (MATH-MASC) are also expected to demonstrate competency in 2A5. Teaching majors (MATT) are also expected to demonstrate competency in 2A7.

2.A Foundational Knowledge

2A1: Mathematical Knowledge: Models and Applications Students construct mathematical models, solve problems in other disciplines (such as art, music, science, social science, business), and investigate their behavior analytically, numerically, and graphically.

2A2: Mathematical Knowledge: College Algebra, Precalculus, and Calculus Students use algebra, trigonometry, and calculus to solve problems and can explain the relationships between fundamental calculus concepts of limit, continuity, derivative, and definite integral.

2A3: Mathematical Knowledge: Algebraic Structures Students use and prove properties of groups, rings, and fields and can describe the relationships between objects and their sub-objects. Students also use matrices and matrix algebra to solve systems of linear equations, to understand the geometry of Euclidean n -space, and to describe the relationship between systems of linear equations, matrices, determinants, vectors, linear transformations, and eigenvalues.

2A4: Mathematical Knowledge: Statistics and Probability Students analyze data using commonly used statistical methodologies; have a rational understanding of the concepts of variability, uncertainty, randomness, and inference; and have the evidentiary thinking and critical reasoning skills necessary to evaluate data and information and to apply numerical concepts in real-life situations.

2A5: Mathematical Knowledge: Actuarial Science Students apply the concepts of actuarial science in solving problems related to financial security.

2A6: Mathematical Knowledge: Multiple Representations Students recognize and use multiple representations of a mathematical concept including numeric, verbal, graphical, pictorial, symbolic, and concrete.

2A7: Mathematics Teaching Knowledge: Geometric/Algebraic Connections Students translate a geometric concept into a related numeric or algebraic one and vice versa.

2A8: Mathematical Knowledge: External Assessments Students will take external assessments to measure their knowledge in their field of study (e.g., certification exam, actuarial exams, major field test, etc.)

2.B Critical Thinking

2B1: Critical and Logical Reasoning: Proof Techniques Students prove conjectures using various methods of proof including direct argument, contradiction, contrapositive, and mathematical induction.

2B2: Critical and Logical Reasoning: Inductive/Deductive Reasoning Students distinguish between deductive and inductive reasoning.

2.E Research/Creative Activity

2E1: Research Knowledge Students are able to conduct an independent investigation of mathematical concepts.

2.F Written Communication

2F1: Written Communication: Understanding Students state a problem accurately, articulate assumptions, and describe a method of solution.

2F2: Written Communication Students give written reports that are mathematically accurate, accessible to fellow students, and at the appropriate mathematical level.

2.G Oral Communication

2G1: Oral Communication: Understanding Students state a problem accurately, articulate assumptions, and describe a method of solution.

2G2: Oral Communication Students give oral presentations that are mathematically accurate, accessible to fellow students, and at the appropriate mathematical level.

2.L Technology

2L1 Technology: Software Tools Students are able to use technology such as a graphing calculator, a computer algebra system, a spreadsheet, and statistical analysis software to model a situation and are able to interpret the numerical, graphical, and algebraic results.

2L2 Technology: Programming Students are able to program in a high-level procedure language using constructs such as loops, if-statements, and arrays.

7. Provide the date of the last revision of the assessment plan addressing each of your majors/programs.

The last major revision of our assessment plan for our majors was during the 2016–17 academic year.

Refer to your annual outcomes assessment findings and continuous improvement plans for the last five complete assessment cycles (from the 2014–15 academic year forward).

8. Provide two examples of success in meeting acceptable or ideal targets in measures of student learning outcomes and describe how you are maintaining those results.

BA Mathematics (MATH):

- In MATH 325, students will be able to find the eigenvalues and associated eigenvectors of a matrix. In Spring 2018, students met the acceptable target for this outcome. The instructor for the course will continue to have students practice the calculation of eigenvalues and eigenvectors and to emphasize how they are used.
- In MATH 377, students will be able to construct standard graphs and compute standard numerical summaries using R. In fall 2017, students met the acceptable target for this outcome. The instructor for the the course will continue to demonstrate to students how to use R and require students to use the software.

BS Mathematics (MATH):

- In MATH 341, student will be able to write a computer program to estimate the value a definite integral using the trapezoid rule, Simpson's rule, adaptive quadrature, Romberg algorithm, etc. In fall 2018, students met the acceptable target for this outcome. The instructor of the course will continue emphasize the importance of numerical calculations and develop the algorithms for the numerical calculations. Students will continue to write code that will implement these algorithms.
- In MATH 445, students will be able to calculate EOY, NPV, IRR, and rates of return. In spring 2018, students met the ideal target for this outcome. The instructor for the course will continue to emphasize the calculations and how they are used by actuaries.

Mathematics for Grades 7–12 Teacher Certification (MATT):

- In MATH 412, students will use deductive reasoning and logical statements to prove a geometric concept using Geometer's Sketchpad. In fall 2017, students met the acceptable target for this outcome. The instructor will continue to require students to produce proofs using technology.
- Student teachers are required by the Teacher Education Department to pass the content certification exam prior to student teaching. This is an external assessment of the knowledge of grades 7-12 pre-service teachers. During the 2018–19 year, students met the acceptable target. The department will continue to review its curriculum and students' performance in courses and address deficiencies before students take the content certification exam.

9. Provide two examples of times you did not reach your acceptable target for a measure of a student learning outcome, describe what you did to address the shortfall, and provide an update on progress toward reaching that target.

BA Mathematics (MATH):

- In MATH 286, students will be able to calculate iterated integrals, change coordinates, change the order of integration, and/or use iterated integrals to solve problems. During fall 2017 and spring 2018, students did not meet the acceptable target. The instructor for the course will schedule additional time during the semester so that students can have additional practice to master this topic.
- In MATH 351, students will be able to apply and use several irreducibility theorems. In fall 2018, students did not meet the acceptable target. The instructor of the course is switching to a text that places groups before rings which most find to be a more natural order for the course. In addition, the instructor plans to create custom homework assignments that will also give students a better grasp of the learning outcomes.

BS Mathematics (MATH):

- In MATH 361, students will be able to use a technique such as the integrating factor method, Laplace transform, or method of undetermined coefficients to solve a first or second order differential equation. In fall 2018 and spring 2019, the students did not meet the acceptable target. The instructor believes that the biggest issue is likely with the assessments themselves. The course is primarily focused on modeling and the assessments are primarily based on rote calculation. The course has evolved so that the calculations are not as important as they used to be. The department will adjust the assessments to better reflect the nature of the course. The instructor is also looking for an online homework solution to help students better practice these rote calculations.
- In MATH 477, students will be able to analyze and interpret data using appropriate statistical techniques. In spring 2018, the students did not meet the acceptable target. The instructor will continue to emphasize how to use technology to analyze data and then interpret the data by providing additional examples and additional opportunities for students to gain experience.

Mathematics for Grades 7–12 Teacher Certification (MATT):

- In MATH 311, students will be able to connect statements made with justification of the reasons with properties of geometric figures in art/design/architecture. In spring 2017, students did not meet the acceptable target. The instructor will provide additional opportunities for students to practice connecting statements to geometric figures in art/design/architecture.
- In MATH 410, students will be able to use multiple representations to describe a geometric sequence/series. In fall 2018, students did not meet the acceptable target. The instructor will provide additional opportunities for students to practice using multiple representations. Because of health issues in fall 2018, the topic was relegated to one day during the last week of the semester and students did not have sufficient opportunity to master this topic. Moving forward, this topic will have additional class time and emphasis.

Faculty (department-level response)

10. Use the template below to compile a table that includes a row for each faculty member who has taught in your department from Fall 2015 through Spring 2020. The table should show:
Current rank and full-time/part-time status
 - (a) Teaching (number of courses, sum of credit hours taught, and total students enrolled in courses during this period)
 - (b) Scholarship (citation for each publication, presentation, and creative work completed during this period)
 - (c) University service (contributions at the department, college, and university level during this period)

Two reports in Activity Insight will provide this data. Run Scheduled Teaching by Faculty (Teaching) and Annual Faculty Accomplishments for August 1, 2015, to May 31, 2020. Scheduled Teaching information for the current year will be complete in Activity Insight after the beginning of the spring semester. On Annual Faculty Accomplishments, the Scholarly Activity section (all categories) provides the content for the Scholarship column of the table, and the Service section (Committee and Administrative Responsibilities category only) provides the content for the University Service column.

Name	Rank/Status	Teaching	Scholarship	University Service
Phyllis Bolin	Associate Professor / FT	33 courses 84 hours 402 students	- Yandell, T. L. (Co-Principal), Bolin, P. A. (Co-Principal), “2020 Grant,” Sponsored by Adams Center for Teaching and Learning, Abilene Christian University, \$1,250.00. (September 2, 2019–May 2020). - Bolin, P. A., Yandell, T. L. (Co-Principal), “20/20 Grant,” Sponsored by Adams Center for Teaching and Learning, Abilene Christian University, \$2,250. (September 2019–May 2020). - Bolin, P. A., Yandell, T. L., “Co-Requisite Learning,” Sponsored by ACU, Abilene Christian University, \$9,000. (June 2018–May 2019). - Reviewer, Book, National Council of Teachers of Mathematics, Reston, Virginia. (September 2017–Present). - Reviewer, Journal Article, National Council of Teachers of Mathematics, Reston, Virginia. (September 2014–Present). - Reviewer, Book, National Council of Teachers of Mathematics, Reston, Virginia. (November 2016–January 2017). - Bolin, P. B. QEP Impact Report. 5th Year Interim Report for SACSCOC. (Submitted). - Bolin, P. B. QEP Impact Report. 5th Year Interim Report for SACSCOC. (In Preparation; Not Yet Submitted). (2016). In P. B. Bolin (Ed.), 5th Year Annual Impact Report. Abilene:. (2016). In P. Bolin (Ed.), 4th Year Annual Impact Report. Abilene: (Published). - Bolin, P. A. (2015). Shifting Vision: Mentoring as faculty development for all levels of experience. <i>The Mentoring Continuum: From Graduate School through Tenure</i>. Syracuse, NY: Syracuse University Press. (Published).	- Committee Member, Faculty Renewal Leave. (September 2018–Present). - Committee Member, Teacher Education Academic Council. (September 2014–October 2019). - Director, Pursuit. (December 2011–December 2017).

Name	Rank/Status	Teaching	Scholarship	University Service
Phyllis Bolin (continued)			• “Co-Requisite Learning” (Planning). This research will pair two courses, MATW 019 and MATW 120 in efforts to analyze the impact on student learning and retention. • Conference Attendance, “Annual Meeting,” National Council of Teachers of Mathematics, Washington, DC, District of Columbia, United States. (April 25, 2018–April 28, 2018). • meeting to learn and work on ideas for Study Abroad for students, “Leipzig, Germany,” ACU, Leipzig, Germany. (October 23, 2017–October 28, 2017). • Conference Attendance, “Annual Meeting,” National Council of Teachers of Mathematics, San Antonio, TX Texas, United States. (April 5, 2017–April 8, 2017). • Research Conference, “Research in Mathematics Education,” National Council of Teachers of Mathematics, San Antonio, TX Texas, United States. (April 3, 2017–April 5, 2017). • Program Committee and Attendee, “International Conference for Teaching Collegiate Mathematics,” Pearson, Chicago, Illinois, United States. (March 8, 2017–March 12, 2017). • Conference Attendance, “Annual Meeting,” SACSCOC, Atlanta, Georgia, United States. (December 2, 2016–December 6, 2016). • Conference Attendance, “Summer Institute,” SACSCOC, Dallas, TX Texas, United States. (July 17, 2016–July 20, 2016). • Program Committee and Attendee, “International Conference for Teaching Collegiate Mathematics,” Pearson, Atlanta, Georgia, USA. (March 10, 2016–March 12, 2016).	

Name	Rank/Status	Teaching	Scholarship	University Service
Phyllis Bolin (continued)			• Conference Attendance, “Research in Mathematics Education,” Dallas, TX Texas, us. (February 19, 2016). • Conference Attendance, “Annual Meeting,” SACSCOC, Houston, Texas, USA. (December 5, 2015–December 8, 2015).	
Roxana Dita	Adjunct Instructor / PT	18 courses 45 hours 341 students	N/A	N/A
John Ehrke	Associate Professor / FT	42 courses 121 hours 663 students	• Ehrke, J. E., Witemeyer, B. (Presenter), Texas Section of the MAA, “SIMIODE Reflections on Modeling First Approaches,” Texas Section of the MAA, Denton, Texas. (March 27, 2020). • Ehrke, J. E., Texas Section of the MAA, “Finding an Assessment Style That Fits the Modern Mathematics Course,” Mathematics Association of America, Tarleton State University, Stephenville TX. (March 29, 2019). • Ehrke, J. E., ICTCM 2018, “A Team-Based Collaboration Model Using Mural,” Pearson, Washington D.C. (March 17, 2018). • Ehrke, J. E., Canvas Coterie, “Mastery Grading in Canvas,” Adams Center, Adams Center. (February 28, 2019). • Ehrke, J. E., AISD Pre-Session 2018, “Mathematics Education: A Modeling Approach,” Abilene ISD, Cooper High School. (August 14, 2018). • Ehrke, J. E., Adams Center 2018, “What Employers Want: Redesigning Assessment in a Team-Based World,” Abilene Christian University, Adams Center. (April 26, 2018). • Ehrke, J. E. (Presenter), Department Colloquium, “What Can I Do With a Math Major?,” ACU Mathematics Department, Abilene Christian University. (October 5, 2016).	• Faculty Advisor, Mu Sigma. (September 2017–Present). • Committee Member, Research Council. (September 2017–Present). • Attendee, Meeting, Specifications Reading Group. (September 2017–Present). • Committee Member, TEDxACU Speaker Selection Committee. (October 1, 2014–Present). • Judge, Undergraduate Research Festival. (January 2012–Present). • sole person responsible, Library Liaison. (September 1, 2009–Present). • Committee Member, CASAC - College of Arts and Sciences Academic Council. (September 1, 2015–May 1, 2018). • Committee Member, CASAC - College of Arts and Sciences Academic Council. (October 2019–Present). • Committee Member, LINK. (September 1, 2011–January 1, 2017).

Name	Rank/Status	Teaching	Scholarship	University Service
John Ehrke (continued)			• Ehrke, J. E. (Author & Presenter), ICTCM, "Technology Enhanced Flipped Classroom Phases," Atlanta, GA. (March 11, 2016). • Ehrke, J. E. (Panelist), Lee, S. K., Slaymaker, R. R., Faculty Fusion, "How Learning Works," Abilene Christian University, Abilene, TX. (August 18, 2015). • Minde Fellow 2019, SIMIODE. (June 2019). • CAS Classroom Teaching Award 2019, College of Arts and Sciences. (March 26, 2019). • Ehrke, J. E. Analysis of Waiting Times in Lines. Abilene: SIMIODE. simiode.org (In Preparation; Not Yet Submitted). • Ehrke, J. E. (2016). Developing Pre-Class Activities for the Flipped Classroom. https://www.pearsoned.com/education-blog/developing-pre-class-activities-flipped-classroom/?utm_source=social&utm_medium=TWITTER (Published). • "Adopting the Flipped Model for Mathematics Instruction" (On-Going). I'm in the process of developing new curriculum for all my courses that leverage out of class pre-reading and self made podcasts to explore more advanced problems/concepts in class. This is commonly referred to as the flipped model of teaching. • "Green's Function Applications to Nonlocal BVPS" (On-Going). • "Integrability of Differential Equations" (On-Going). • Ehrke, J. E. (Principal), "Reimagining corporate workflows for collaboration based learning," Sponsored by Abilene Christian University (20/20 grant), Abilene Christian University. (June 2017–June 2018).	

Name	Rank/Status	Teaching	Scholarship	University Service
David Hendricks	Associate Professor / FT	46 courses 104 hours 800 students	- Hendricks, T. D. (Presenter), Claussen, B. (Presenter), Hinojosa, E. (Presenter), ATPE Annual Summit, "Texas Lesson Study," Association of Texas Professional Educators, Houston, Texas. (July 19, 2019). - Yarema, C. H. (Presenter), Hendricks, T. D. (Presenter), MathFest, "Lesson Study: A Capstone Experience to Address the Recommendations of the MET II Document," Mathematical Association of America, Washington, DC. (August 5, 2015). - Hendricks, T. D., Texas Section MAA 2019 Spring Meeting, "Service Activities for New Faculty," Texas Section of the Mathematical Association of America, Tarleton State University, Stephenville TX. (March 29, 2019). - Distinguished Service Award, Texas Section of the Mathematical Association of America. (April 6, 2018). - Colleague Service Award, ACU College of Arts and Sciences. (April 3, 2018).	- Committee Member, Undergraduate Readmission Committee. (September 2019–Present). - Committee Member, Faculty Renewal Leave. (September 2018–Present). - Director, Dual Credit. (January 2016–May 2018). - Department Chair. (August 2013–Present).
Debby Hewitt	Adjunct Instructor / PT	14 courses 42 hours 360 students	N/A	N/A
Brooke Hollingsworth	Dual Credit Instructor / PT	4 courses 12 hours 25 students	N/A	N/A
Alexander Karabegov	Professor / FT	40 courses 117 hours 1088 students	- Karabegov, A. (2019). Formal oscillatory integrals and deformation quantization. <i>Letters in Mathematical Physics</i>, Springer, 109(8), 1907–1937. https://rdcu.be/bpvNP - Karabegov, A. (2018). <i>A solution of Problem A5, Putnam 2018</i>. San Diego, CA: Putnam archive. https://kskedlaya.org/putnam-archive/ - Karabegov, A. V. (2017). A heat kernel proof of the index theorem for deformation quantization. <i>Letters in Mathematical Physics</i>, Springer, 107(11), 2093–2145.	- Presenter, A colloquium presentation. (February 13, 2020). - I hosted the Putnam Mathematical Competition at ACU, Putnam exam host. (December 7, 2019). - I train a student for the Putnam Exam. (October 4, 2019–December 7, 2019).

Name	Rank/Status	Teaching	Scholarship	University Service
Alexander Karabegov (continued)			• Karabegov, A. V. (2017). Deformation quantization with separation of variables of a super-Kaehler manifold (vol. 114, pp. 197–215). international: <i>Journal of Geometry and Physics</i>, Elsevier. • Karabegov, A. V. (2016). On the phase form of a star product with separation of variables. <i>Journal of Geometry and Physics</i>, 104, 30–38. • Karabegov, A. V., Special Session on Supergeometry, Poisson Brackets, and Homotopy Structures, I, “A category of formal differential mappings,” American Mathematical Society, University of Wisconsin–Madison, Madison, WI. (September 15, 2019). • Karabegov, A. V., Modern trends in noncommutative geometry, in honor of Boris Tsygan,, “The inverse problem of the stationary phase method,” Northwestern University, Evanston, IL. (May 20, 2019). • Karabegov, A. (Presenter), “Deformation quantization of pseudo-Kahler manifolds,” University of Toledo, Toledo, OH. (November 9, 2018). • Karabegov, A. V., Representation theory at the crossroads of modern mathematics, in honor of Alexandre Kirillov, “A heat kernel proof of the algebraic index theorem,” Reims, France. (May 29, 2017). • Karabegov, A. V., XXXV Workshop on Geometric Methods in Physics, “Deformation quantization with separation of variables on a split supermanifold,” Bialowieza, Poland. (June 27, 2016).	• A colloquium presentation, A colloquium presentation. (October 17, 2019). • I mentor a student. (January 17, 2017–July 25, 2019). • A colloquium presentation, A colloquium presentation. (February 5, 2019). • Training of the Putnam exam team, Putnam Competition Training. (September 7, 2018–December 7, 2018). • Putnam Competition Team Coach, Putnam Competition training. (September 16, 2017–December 2, 2017). • A colloquium talk. (April 11, 2017). • A colloquium talk. (October 8, 2016–October 11, 2016). • A colloquium talk. (September 4, 2016–September 6, 2016). • I help to coach the Calculus Bowl teams. (February 18, 2016–March 31, 2016). • I gave a colloquium presentation. (March 9, 2016–March 10, 2016). • I give extracurricular colloquium talks (presentations). (January 21, 2016–March 10, 2016). • I gave a colloquium presentation. (September 8, 2015).

Name	Rank/Status	Teaching	Scholarship	University Service
Alexander Karabegov (continued)			• Karabegov, A. V., International conference on geometry and quantization (GEOQUANT 2015), “On the phase form of a deformation quantization with separation of variables,” ICMAT, Campus de Cantoblanco,, Madrid, Spain. (September 7, 2015). • Karabegov, A. V., “Deformation quantization of Kahler manifolds and formal Calabi Functions,” University of Geneva, Geneva, Switzerland. (November 27, 2019). • Reviewer, Journal Article. (December 1, 2019–January 15, 2020). • Reviewer, Journal Article. (June 15, 2019–August 15, 2019). • Reviewer, Journal Article. (August 13, 2016). • Reviewer, Journal Article. (July 15, 2016–July 21, 2016). • Karabegov, A. An algebra of distributions related to a star product with separation of variables. <i>Letters in Mathematical Physics</i>, Springer, 23 pages. (Submitted). • Karabegov, A. V. (2018). <i>Unistochastic matrices</i> (edited Wikipedia article). (Published). • “Algebraic index theorem for deformation quantization with separation of variables” (Writing Results). We give a heat kernel proof of the algebraic index theorem for deformation quantization with separation of variables on a pseudo-Kaehler manifold.	
Lea McClaran	Dual Credit Instructor / PT	8 courses 24 hours 20 students	N/A	N/A
Julie McQueen	Instructor / Retired	17 courses 34 hours 263 students	• Conference Attendance, “NCTM Annual Meeting and Exposition,” National Council of Teachers of Mathematics, San Antonio, TX, USA. (April 5, 2017–April 8, 2017).	• Attendee, Meeting, Athletic Committee. (December 2013–May 2017).

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Julie McQueen (continued)			Conference Attendance, "AMTE-TX Fall Conference," Association of Mathematics Teacher Educators, Abilene, TX, USA. (September 23, 2016–September 24, 2016).	
Andy Potter	Adjunct Instructor / PT	3 courses 9 hours 28 students	N/A	N/A
Mark Riggs	Professor / FT	42 courses 108 hours 1271 students		- Liaison with actuarial society. (June 2014–Present). - Maintain departmental software contracts, lab and classroom computers. (June 2014–Present). - Maintain departmental website. (June 2014–Present). - Social media for department. (June 2014–Present). - Committee Member, Health Professions Advisory Committee. (August 2013–Present). - Committee Member, Student Life Committee. (August 2016–July 2019). - University Senate Service, Faculty Senate. (August 2015–July 2018). - Committee Member, University Tenure and Promotion Committee. (August 2015–July 2018). - Assistant department chair. (January 11, 2016–June 2018). - Volunteer with ACU Orchestra. (August 2014–July 2016).
Cheryl Schwiethale	College Professor / FT	42 courses 120 hours 1083 students	Schwiethale, C. D., "MATH 120 General Education Assessment," Department of Mathematics, ACU. (January 20, 2016).	Conference-Related. (April 5, 2017–April 8, 2017).

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John Smallwood	Assistant Professor / FT	34 courses 95 hours 751 students	•	• Sunday evening homework/exam help sessions for my Precalculus students. (September 2014–Present).
Traci Yandell	College Assistant Professor / FT	25 courses 61 hours 287 students	• Yandell, T. L. (Co-Principal), Bolin, P. A. (Co-Principal), “2020 Grant,” Sponsored by Adams Center for Teaching and Learning, Abilene Christian University, \$1,250. (September 2, 2019–May 2020). • Bolin, P. A., Yandell, T. L. (Co-Principal), “20/20 Grant,” Sponsored by Adams Center for Teaching and Learning, Abilene Christian University, \$2,250. (September 2019–May 2020). • Bolin, P. A., Yandell, T. L., “Co-Requisite Learning,” Sponsored by ACU, Abilene Christian University, \$9,000.00. (June 2018–May 2019). • “Co-Requisite Learning” (Planning). This research will pair two courses, MATW 019 and MATW 120 in efforts to analyze the impact on student learning and retention. • Master Teacher Academy, “Master Teacher Academy,” Adams Center for Teaching and Learning, Abilene, TX, United States. (September 2018 - May 2019). • Conference Attendance, “ICTCM,” Pearson, Pheonix, Arizona, United States. (March 2019). • Conference Attendance, “Chicago Lesson Study Conference,” Lesson Study, Chicago, Illinois, United States. (April 2018).	• Committee Member, Teacher Education Academic Council. (January 2019–Present).
Connie Yarema	Professor Emerita / PT	28 courses 76 hours 472 students	• Yarema, C. H., Gee, D. (2018). Look Beyond Just Getting the Answer. <i>The International Journal of Adult, Community and Professional Learning</i> , 25(1–2), 11–24.	• Committee Member, Faculty Renewal Leave Committee. (August 22, 2016–May 2018). • Committee Member, Research Council Committee. (August 25, 2014–May 2017).

Name	Rank/Status	Teaching	Scholarship	University Service
Connie Yarema (continued)			• Yarema, C. H. (2017). <i>Using a Japanese Framework to Deepen Preservice Teachers' Knowledge of Multiplication</i> (2nd ed., vol. 8, pp. 44–49). Memphis, TN: MathAMATYC Educator. • Yarema, C. H., Gee, D. (2016). Experiencing Lesson Study: Preservice Secondary Mathematics Teachers' Perceptions. <i>The International Journal of Science, Mathematics, and Technology</i>, 23(1). • Yarema, C. H., Gee, D. (in press). Lesson Study: A Structure to Enhance Pedagogic Development. <i>Journal of Pedagogic Development</i>. • Yarema, A. (Author & Presenter), Yarema, C. (Author & Presenter), Gee, D. (Author & Presenter), World Association of Lesson Studies 2017 International Conference, "Successes and Challenges of Texas USA Lesson Study: Geographical Influences," Nagoya University, Nagoya, Japan. (November 26, 2017). • Yarema, C. H., Association of Mathematics Teacher Educators-Texas Fifth Fall Meeting, "Texas Lesson Study Initiative: The What, When, Where, How, and Challenges," AMTE-TX, Ft. Worth, Texas. (September 29, 2017). • Yarema, C. H., Gee, D. (Author & Presenter), Twenty-fourth International Conference on Learning, "Lesson Study: Teachers' Descriptions of Professional Growth and Student Learning," University of Hawaii at Manoa, Honolulu Hawaii. (July 21, 2017). • Yarema, C. H., de Zavala Middle School Lesson Study Open House, "Sixth Grade Lesson Final Comments: 2 1/2 Times Larger," Amarillo ISD de Zavala Middle School, Amarillo Texas. (October 24, 2016).	

Name	Rank/Status	Teaching	Scholarship	University Service
Connie Yarema (continued)			• Yarema, C. H., TEA Lesson Study Initiative Region 14 Workshop, “Lesson Study in Texas: Cultural Background,” ESC Region 14, Abilene, Texas. (September 7, 2016). • Yarema, C. H., Gee, D. (Presenter), Learner Conference: Education in the Age of the Anthropocene, “Lesson Study: A Framework for Developing Preservice Secondary Mathematics Teachers’ Knowledge of Content and Students in the Technology Age,” Vancouver, British Columbia Canada. (July 2016). • Yarema, C. H., Texas Section Meeting, “Adhering to the MET II Document: Impact of Professional Development to Strengthen Practicing Teachers’ Mathematical Knowledge for Teaching,” Texas Section of Mathematical Association of America, Nacogdoches, Texas. (April 1, 2016). • Yarema, C. H. (Presenter), Gee, D. (Presenter), AMTE-TX Annual Meeting 2015, “Look Beyond Just Getting the Answer: Lesson Study to Enhance Mathematics Teaching,” AMTE-TX, Stephenville, TX. (September 26, 2015). • Yarema, C. H. (Presenter), Hendricks, T. D. (Presenter), MathFest, “Lesson Study: A Capstone Experience to Address the Recommendations of the MET II Document,” Mathematical Association of America, Washington, DC. (August 5, 2015). • Yarema, C. H. (Principal), “West Texas Mathematics Consortium – ACU, ASU, UTPB,” Sponsored by Texas Teacher Quality Grants Program, State, \$108,532. (May 1, 2015–April 30, 2016).	

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Connie Yarema (continued)			• Associate Editor, The International Journal of Adult, Community and Professional Learning, Vol. 23, Issue 1, Common Ground Publishing for the Learner Collection. (February 3, 2016). • Editor, Associate Editor, The International Journal of Learning: Annual Review, Volume 23, 2016. (September 2015–August 2016). • Editor, Associate Editor, The International Journal of Adult, Community and Professional Learning, Volume 23, Issue 1, Vancouver, British Columbia. (September 2015–December 2015). • Editor, Journal Editor, AMTE-TX LINK. (October 2014–November 2015). • Conference Attendance, “Texas Section of Mathematical Association of America,” MAA, Commerce, TX, USA. (March 30, 2017–April 1, 2017). • Workshop, “Implementing Lesson Study,” Chicago Lesson Study Alliance, Chicago, Illinois. (August 22, 2016–August 26, 2016). • Workshop, “TEA Lesson Study Initiative Training,” Texas Education Agency, Austin, Texas. (August 15, 2016–August 16, 2016). • Conference Attendance, “Chicago Lesson Study Group Conference: Developing Perseverance and Mathematical Communication,” Chicago Lesson Study Group, Chicago, Illinois, USA. (May 5, 2016–May 7, 2016). • Conference Attendance, “Principles to Action,” Association of Mathematics Teacher Educators of Texas, Stephenville, TX. (September 25, 2015–September 26, 2015).	

Optional Response — Growth

11. The university will consider undergraduate and graduate programs for expansion and addition in the coming months. In no more than 300 words, explain any recommendations you have for investment in your discipline or a related discipline.

Data science is currently a high-demand field that has the potential to attract new students to ACU. Growth in the demand for data scientists who are part mathematician/statistician, computer scientist, and trend spotter is growing at a rate of 29% year over year, but searches by job seekers has only grown by 14% per year. This indicates a significant gap between supply and demand.

<https://searchbusinessanalytics.techtarget.com/feature/Demand-for-data-scientists-is-booming-and-will-increase>

Data scientists typically specialize into areas like machine learning, artificial intelligence, research, database management – all courses that ACU offers. The degree proposal would be highly attractive and customizable for students, including a heavy mathematics/statistics and programming base, supplemented by business, information technology, computer science, and physics courses. Students graduating with such a degree would be in prime position for one of the many masters programs in Data Science that are quickly growing around the state and nation.

The department has begun mapping out a new Data Science degree plan. The department believes that we could develop this program using courses that are already offered in the College of Arts and Sciences and College of Business Administration. As the program grows, we could add faculty specifically for the data science program.