APR Instructional Mathematics 2022-23 Latest Version

Annual program review for mathematics, reviewing the 2022-23 Academic Year

APR Instructional

Annual Course Student Learning Outcome Data : Version by **Bangs, Michael** on **12/14/2023 22:48**

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
MAT104 - College Trigonometry		
1. Provide and analyze graphs of trigonometric functions. (Active from Fall 2015)	70.00%	95.45%
2. Apply trigonometric techniques to solve problems in real-world contexts. (Active from Fall 2015)	70.00%	95.45%
3. Derive and prove trigonometric properties and identities. (Active from Fall 2015)	70.00%	81.82%
4. Produce solutions to equations using skills developed in trigonometry. (Active from Fall 2015)	70.00%	95.45%
MAT105 - Calculus and Analytic Geometry (Part I)		
1. Differentiate functions of a single variable using the basic rules of differentiation. (Active from Fall 2015)	70.00%	90.63%
2. Apply the derivative to describe phenomena arising from real-life situations. (Active from Fall 2015)	70.00%	87.50%
3. Sketch and analyze graphs using the first and second derivatives. (Active from Fall 2015)	70.00%	90.63%
4. Prove corollaries and derive equations using the theorems that relate to differential calculus. (Active from Fall 2015)	70.00%	90.63%
5. Determine limits and continuity using graphical, analytical, and tabular techniques. (Active from Fall 2015)	70.00%	84.38%
MAT106 - Calculus and Analytic Geometry (Part II)		
1. Employ integrals to applications from physics. (Active from Fall 2015)	70.00%	100.00%
2. Apply the Fundamental Theorem of Calculus in determining indefinite integrals. (Active from Fall 2015)	70.00%	100.00%
3. Compute geometric quantities using integrals. (Active from Fall 2015)	70.00%	100.00%
4. Solve differential equations. (Active from Fall 2015)	70.00%	100.00%
5. Determine integrals and derivatives of transcendental functions. (Active from Fall 2015)	70.00%	100.00%
MAT107 - Calculus and Analytic Geometry (Part III)		
1. Test series for convergence. (Active from Fall 2015)	70.00%	86.67%
2. Relate analytic functions to their power series. (Active from Fall 2015)	70.00%	93.33%
3. Apply calculus to functions of several variables. (Active from Fall 2015)	70.00%	93.33%
4. Model real life applications using three-dimensional constructs. (Active from Fall 2015)	70.00%	100.00%
5. Perform arithmetic on vectors using both component and geometric forms. (Active from Fall 2015)	70.00%	100.00%
MAT109 - Mathematics for Elementary Education		
1. Analyze multiple approaches to solving problems from elementary and advanced levels of mathematics. (Active from Fall 2015)	70.00%	88.89%
2. Compare and contrast the concepts and structures of several different numeration systems, including their historical development. (Active from Fall 2015)	70.00%	88.89%
3. Evaluate numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances as relates to the teaching of K-8 students. (Active from Fall 2015)	70.00%	100.00%

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
4. Create an active learning environment to express mathematical ideas to elementary and middle school children. (Active from Fall 2015)	70.00%	100.00%
MAT110 - College Algebra for STEM		
1. Produce and interpret graphs of functions and relations. (Active from Summer 2017)	70.00%	80.00%
2. Apply techniques to solve polynomial and rational equations and inequalities. (Active from Summer 2017)	70.00%	80.00%
3. Model real-life situations using algebraic methods. (Active from Summer 2017)	70.00%	80.00%
4. Simplify algebraic expressions using skills obtained in the course. (Active from Summer 2017)	70.00%	80.00%
5. Employ matrices and their properties to solve systems of equations. (Active from Summer 2017)	70.00%	80.00%
MAT118 - Calculus for Business and Social Sciences		
1. Evaluate limits, derivatives, and integrals for both single variable and multivariable functions. (Active from Fall 2015)	70.00%	84.21%
2. Apply the integral and derivative to analyze functions that arise from business and social science applications. (Active from Fall 2015)	70.00%	84.21%
3. Solve differential equations that arise from business and social science applications. (Active from Fall 2015)	70.00%	78.95%
4. Apply analytic geometry to analyze curves and surfaces. (Active from Fall 2015)	70.00%	78.95%
MAT119 - Topics in Applied Mathematics		
1. Apply mathematics to solve both minor and major problems that arise in the professional world. (Active from Fall 2015)	70.00%	100.00%
2. Explore and demonstrate the artistic and conceptual beauty of mathematics. (Active from Fall 2015)	70.00%	100.00%
MAT159 - Math Preparation for Statistics		
1. Interpret and extract information from tables and graphical displays of data. (Active from Summer 2019)	70.00%	0.00%
2. Translate written language into mathematical statements. (Active from Summer 2019)	70.00%	0.00%
3. Construct, use, and interpret linear equations to represent and communicate relationships in quantitative data. (Active from Summer 2019)	70.00%	0.00%
4. Produce simplified answers to numerical and algebraic expressions using the order of operations and solve linear algebraic equations. (Active from Summer 2019)	70.00%	0.00%
MAT187 - Basic Arithmetic		
1. Perform arithmetic operations with whole numbers, fractions, decimals, percentages, and signed numbers. (Active from Summer 2016)	70.00%	0.00%
2. Translate written language into mathematical statements. (Active from Summer 2016)	70.00%	0.00%
3. Apply the concepts in the course to real-life situations. (Active from Summer 2016)	70.00%	0.00%
4. Apply study skills learned in this class to their studying in this class. (Active from Summer 2016)	70.00%	0.00%
MAT201 - Elementary Statistics		
1. Design and implement an unbiased study that will produce sound statistical results. (Active from Fall 2015)	70.00%	84.13%
2. Generate and interpret statistics graphs from data that arise from surveys and experiments. (Active from Fall 2015)	70.00%	84.13%
3. Implement the rules of probability. (Active from Fall 2015)	70.00%	77.78%
4. Apply confidence intervals and test hypotheses to make conclusions about data that come from practical applications. (Active from Fall 2015)	70.00%	75.40%

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
5. Perform regression analysis to make informed predictions about relationships between quantitative variables. (Active from Fall 2015)	70.00%	74.60%
MAT202 - Calculus and Analytic Geometry (Part IV)		
1. Perform calculus on vector value functions. (Active from Fall 2015)	70.00%	100.00%
2. Integrate and differentiate functions of several variables. (Active from Fall 2015)	70.00%	100.00%
3. Relate types of single and multiple integrals using the major theorems of vector calculus. (Active from Fall 2015)	70.00%	100.00%
4. Apply multivariable calculus to problems arising from physics. (Active from Fall 2015)	70.00%	100.00%
MAT203 - Linear Algebra		
1. Apply the theory and techniques of linear algebra in applications from physics, operations research, and other scientific disciplines. (Active from Fall 2015)	70.00%	100.00%
2. Solve linear systems, including under- and over-determined systems. (Active from Fall 2015)	70.00%	100.00%
3. Prove lemmas and corollaries in linear algebra. (Active from Fall 2015)	70.00%	100.00%
4. Relate linear transformations to their matrices with respect to given bases. (Active from Fall 2015)	70.00%	100.00%
5. Describe linear transformations as functions mapping an n-dimensional space to an m-dimensional space. (Active from Fall 2015)	70.00%	100.00%
MAT204 - Differential Equations		
1. Apply ordinary differential equations to problems from physics, biology, and other scientific disciplines. (Active from Fall 2015)	70.00%	100.00%
2. Employ the technique of transformations in finding solutions to ordinary differential equations. (Active from Fall 2015)	70.00%	100.00%
3. Prove results from the field of differential equations. (Active from Fall 2015)	70.00%	90.00%
4. Sketch direction fields for first-order ordinary differential equations. (Active from Fall 2015)	70.00%	100.00%
5. Solve differential equations using sequences, series, and matrices. (Active from Fall 2015)	70.00%	100.00%
MAT103A - College Algebra (Part I)		
1. Produce and interpret graphs of functions and relations. (Active from Fall 2015)	70.00%	78.57%
2. Apply techniques to solve polynomial and rational equations and inequalities. (Active from Fall 2015)	70.00%	78.57%
3. Model real-life situations using algebraic methods. (Active from Fall 2015)	70.00%	71.43%
4. Simplify algebraic expressions using skills obtained in the course. (Active from Fall 2015)	70.00%	78.57%
MAT103B - College Algebra (Part II)		
1. Prove and derive mathematical statements using various methods including induction. (Active from Fall 2015)	70.00%	100.00%
2. Employ matrices and their properties to solve systems of equations. (Active from Fall 2015)	70.00%	100.00%
3. Construct and interpret graphs of conic sections and transcendental functions. (Active from Fall 2015)	70.00%	100.00%
4. Apply the topics of the course to real-world situations. (Active from Fall 2015)	70.00%	100.00%
MAT131H - ST:Support Course for MAT103A		
1. Perform arithmetic operations with whole numbers, fractions, and signed numbers. (Active from Fall 2022)	70.00%	0.00%

CSLOs	Expected/Benchmark Performance	Actual Performance (Aggregate of All Terms)
2. Perform arithmetic (including factoring) with polynomials. (Active from Fall 2022)	70.00%	0.00%
3. Apply the four basic operations to rational and radical expressions. (Active from Fall 2022)	70.00%	0.00%
MAT152A - Basic Algebra (Part I)		
1. Solve linear equations and inequalities. (Active from Summer 2016)	70.00%	100.00%
2. Define and employ terminology and arithmetic relating to polynomials in one variable. (Active from Summer 2016)	70.00%	100.00%
3. Determine the equation and graph a line given information about the line. (Active from Summer 2016)	70.00%	80.00%
4. Manipulate expressions with integral exponents. (Active from Summer 2016)	70.00%	80.00%
5. Apply course topics to real-world situations. (Active from Summer 2016)	70.00%	60.00%
MAT152B - Basic Algebra (Part II)		
1. Factor a polynomial. (Active from Fall 2015)	70.00%	100.00%
2. Apply the four basic operations to rational and radical expressions. (Active from Fall 2015)	70.00%	100.00%
3. Solve equations with rational and radical expressions. (Active from Fall 2015)	70.00%	100.00%
4. Solve a 2 x 2 system of linear equations. (Active from Fall 2015)	70.00%	100.00%
5. Solve quadratic equations. (Active from Fall 2015)	70.00%	100.00%
6. Apply course topics to real-world situations. (Active from Fall 2015)	70.00%	100.00%
MAT154A - Intermediate Algebra		
1. Apply the course topics to real-world situations. (Active from Fall 2015)	70.00%	100.00%
2. Sketch and interpret the graphs of functions and relations introduced in intermediate algebra. (Active from Fall 2015)	70.00%	100.00%
3. Simplify mathematical expressions into forms more amenable to analysis. (Active from Fall 2015)	70.00%	100.00%
4. Provide solutions to equations using methods from intermediate algebra. (Active from Fall 2015)	70.00%	100.00%
MAT191AR - ST: Support Course/Statistics		
1. Implement effective study skills strategies to succeed in the statistics class. (Active from Fall 2022)	70.00%	0.00%
2. Implement appropriate mathematics techniques to solve statistics problems. (Active from Fall 2022)	70.00%	0.00%

APR Questions Tableau : Version by **Richardson, Steven** on **01/31/2024 16:03**

Using the Data Provided (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/LTCCProgramReviewSummary?:iid=1) please provide the number of students (headcount) that are served by the discipline.
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Using the Data Provided (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/Demographics?:iid=1), identify the populations served by the discipline. Are there any inconsistencies? Does the Population served reflect the population of the college? If not, why, and how can the discipline serve a population more reflective of our community?
Male: 42%
Female: 56%

African American	1.6%
Asian	7.5%
Hispanic	33.4%
Native Amer/Alaska Native	0.4%
Pacific Islander	0.2%
White Non-Hispanic	42.1%
Two or more races	7.3%
Other	0.0%
Unknown	7.5%

I do not know if the population served reflects the population of the college.

Using student success data (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/SuccessRatesOverall?:iid=1), identify any trends in successful completion of courses.

Are there particular courses (https://10az.online.tableau.com/#/site/ltcc/views/ProgramReview/SuccessRatesbyCourse?:iid=1) students are struggling in?

Are there any demographics that are less likely to complete certain courses in the discipline?

What steps need to be taken to support students and the department in meeting its equity obligations?

Course success trends are (statistically) flat - i.e. constant across five academic years.

Statistics, unsurprisingly, has the lowest success rate at 73.1%

I do not have information on course completion by demographic, only course success as summarized above.

Are there any courses lacking Title V Updates?

If so, how many and why?

(Please check your courses in eLumen for the most recent list of courses that require updates.)

Yes. 11 courses.   Of these courses, 6 are not longer permitted to be offered. The remaining 5 courses that are overdue are MAT102, MAT103A, MAT103B, MAT104 and MAT202.

They are overdue because they have not yet been updated.

Describe the approach to scheduling in terms of offering a balance of Face to Face (F2F) and Online opportunities for students.

Courses are scheduled by administration.

Are there any insights specific to this discipline regarding scheduling modality in terms of success rates, student retention, or course cancellations?

The only courses for which a contrast of success rates and student retention by modality (face-to-face vs online) are available are MAT118 Business Calculus and MAT201 Elementary Statistics.

Below is a table summarizing student retention and success rates for these two courses by modality

Course	Census Enroll	Census at End	Retention %	Success %
MAT118 face-to-face	14	12	86%	92%
MAT118 online	28	26	93%	92%
MAT201 face-to-face	16.3	14.9	91.5%	73.1%
MAT201 online	24.2	20.8	86.0%	73.6%

There is no statistical difference between the two modalities for either of these courses.

Are the full-time faculty teaching the courses with the most face to face students? Why/why not?

Yes. Because the Math department is precluded from offering any preparatory courses in Mathematics, very few adjuncts are employed.

Are staffing levels adequate to fulfill the purpose of the program?

Yes.

What professional development opportunities have faculty in this discipline taken advantage of? Are there any unmet professional development needs?

Larry Green:

1. Member of the CMC3 board

2. Attended the CMC3 Monterey fall conference, was on the conference committee, was the AV chair, and presented a talk on OER

3. Was the chair of the Spring CMC3 online math conference

4. Attended the Convene Collaborate Connect conference for the UC/CSU/CCC faculty at UCLA and helped lead a workshop

5. Was part of the Convene Collaborate Connect committee where we met online weekly

6. Was appointed the statewide leader of the CCC Open Educational Resources Initiative for mathematics

7. Served as the international head for mathematics and statistics for Multimedia Education for Learning and Online Teaching (MERLOT) where I chaired monthly meetings, led the reviews of online materials in math and stats, and attended monthly meetings for the MERLOT chairs

8. Attended the Online Learning Conference in April.

9. In charge of the statistics OER collection for LibreTexts and co-leader for its mathematics collection

10. Attended and helped run the LibreTexts online workshop

11. Led a statewide grant project to create OER homework collections for linear algebra and differential equations

Where applicable, outline and explain any budget shortfalls for this discipline.

If additional financial resources are needed, please describe how they will increase student success, retention, or completion.

n/a

Using the SLO Data above, are there any SLOs for any particular courses that students are not successfully understanding? How do you plan to address this?

A single SLO (apply course topics to real-world situations) from a course the department is prohibited from offering (MAT152A) has a performance level (60%) less than the benchmark (70%). All other course SLOs have performance levels in excess of the 70% benchmark.

What are the major strengths of your department?

High quality, motivated and industrious teaching faculty.

In what ways could your department improve to better meet the needs of the College and support student success?

We are working on increasing the success rates of Hispanic students.

What are the biggest challenges your department may face in making these improvements?

The fact that those students most needing remedial and supporting instruction choose not to avail themselves of it.

Identify any other questions, comments, suggestions, or concerns you may have.
No Value

Dean Review : Version by **Williams, Sarah** on **01/31/2024 16:36**

With regard to scheduling, it may be beneficial to offer MAT 105 twice a year instead of once a year due to AB1705 and possibly offering online once a year. Will need to add adjunct instructors if math schedule changes.

Sarah Williams