

Instructional Units Program Review Year Five Update - Mathematics Department Latest Version

This cycle is for Instructional Units to complete the Year Five Update of the Program Review Cycle.

Instructional Units Program Review Year Five Update

1. Program Update : Version by Magante, Maria on 10/29/2021 19:36

1a. Provide any important changes or updates within your program since your Program Review Year Three Update (2019-20). (New degrees, new curriculum, staffing changes, etc.)

Staffing Changes

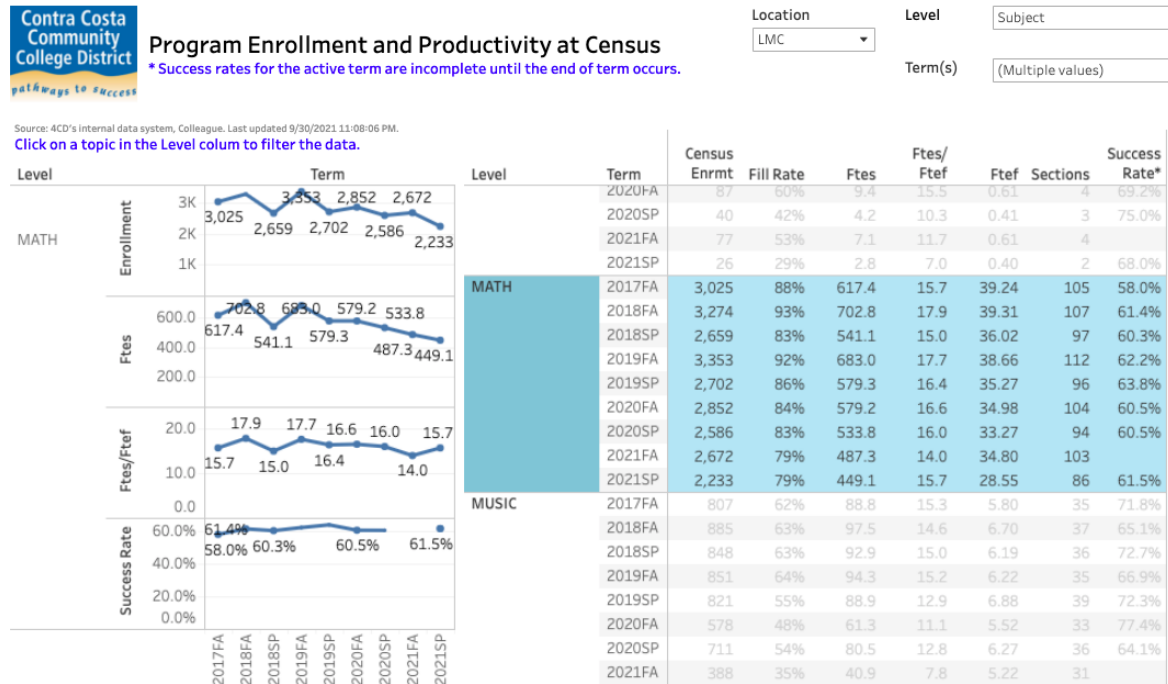
In Fall 2021, the Math Department at Pittsburg hired 1 full-time tenure-track instructor. In 2020, our Math Lab Coordinator at Pittsburg was promoted to a senior lab coordinator.

New curriculum

Since the last program review update, the Math Department created non-credit sections: Math 9N, 12N and 25N. Math 12N and 25N are offered as non-credit mirrored sections. All of our math courses also have the required online addenda for online teaching. We also included additional 2 in-class lab hours for our support courses Math 155S and 140S. In the Brentwood Math Department, their calculus sequence are now being offered as ZTC. And finally, effective Fall 2022, most of our math courses will have changes to their lecture and lab hours to meet the State's threshold for rounding down units. The courses affected by these changes are Math 26, 27, 29, 30, 110, 110S, 120, 140, 140S, 155, 155S, 160, 210, 220, 230, 240, and 250.

1b. Please address the following enrollment data provided for your program.

1.b.1. What are the enrollment trends over the past 3 years, beginning with Fall 2018? (Please address census enrollment, census fill rate, and productivity (FTES/FTEF))



Enrollment and productivity reached a peak in the fall 2019 semester to then decline steadily during the pandemic semesters. Fill rate has gone through a dramatic drop in the last four semesters.

1b. Please address the following enrollment data provided for your program.

1.b.2. What does the data suggest in terms of future needs/directions?

The pandemic seems to have sharply affected our enrollment and productivity, but not our success rate. This suggests the following:

1. The forced transition to online teaching due to the pandemic has been adequately appropriate
- 2.

1c. Provide a brief update on the timeline for your program's goals as listed in your Program Review Year Three Update (2019-2020). If your program's goals are in progress or modified, please include action steps and responsible parties in your explanation.

Goal 1: Adequately staff the math department with full time faculty so that fifty percent of courses are taught by full time faculty.
 Status: In progress.

Rationale: We are making good progress towards this goal, as we have hired 3 new FT positions (2 net, since one was a retirement replacement). But, there's still lots of progress to be made, as the fifty percent mark is not close, either for Pittsburg or Brentwood. Over the last three semesters, the average for FT sections / total sections was closer to 35% for Brentwood, and 46% for Pittsburg. Also, in Pittsburg, there will be a retirement to fill at the end of 2021-2022 academic year. Both Pittsburg and Brentwood has put in a Box 2A for one position (in Brentwood) and three in Pittsburg.
 Responsible Parties and Timeline: Department chairs and dean — Within this and the next academic year.

Goal 2: Develop and expand our accelerated offerings through focused leadership, including student recruitment, curriculum, and professional development
 Status: In progress

Rationale: We still offer Math 29 (Math 25 and 30 combo course), but not as many sections as we used to. Enrollment has been slightly down for them, but the main reason was AB705 and open enrollment in Stats or Precalculus for any student (some with support courses). We used to offer multiple sections of our calculus path (Calculus I and II in the same semester), but the enrollment went down over multiple semesters, and we don't offer it anymore.
 Responsible Parties and Timeline: Department chairs and dean

Goal 3: Design and implement a programmatic effort to support under-served students, including but not limited to students of color and low income students; coordinate our effort with other campus projects.
 Status: In progress

Rationale:
 Responsible Parties and Timeline:

Goal 4: Improve departmental use of data from lab/tutoring assessment research, including but not limited to training for student tutors and faculty tutoring in the math lab.
 Status: In progress

Rationale: The lab coordinators regularly train and support tutors, especially as they are onboarded. This includes mock tutoring sessions. Brentwood includes these when we meet for FLEX. This can be improved, since we were online for FLEX the last three semesters due to the pandemic. We look forward to having more in-person, hands-on trainings. The use of data and research has not been reached, yet.
 Responsible Parties and Timeline:

Goal 5: Design and implement professional development in the form of teaching communities and ordered pairs mentoring for faculty teaching transfer level mathematics
 Status: In progress

Rationale:
 Responsible Parties and Timeline:

Goal 6: Redesign Geometry and Precalculus (trigonometry) preparation for calculus
 Status: In progress

Rationale:
 Responsible Parties and Timeline:

Goal 7: Transform our use of instructional technology, with a potential shift away from calculators to computer/app based options
 Status: In progress

Rationale: Several stats sections use computers (spreadsheets, databases, etc.) instead of calculators. Several precalc and calculus sections use Desmos to graph (instead of calculators or by hand). Not all faculty are against using calculators, and some find it very helpful pedagogically, especially the TI calculators for stats courses.
 Responsible Parties and Timeline: Department chairs / faculty who are interested

Goal 8: Have appropriate facilities resources to appropriately teach to our course outlines
 Status: In progress / Complete

Rationale: Since the pandemic, we have all moved to teaching online. Every one of our faculty who teach online (FT and PT) are BEOI certified. The reason it's still listed as in progress (and not all the way complete) is that we could still use technology to aid us teaching online. This includes over 40 tablet computers in Brentwood that we used to have, but have been lost. This happened sometime when we went to quarantine, and/or moving to the new Brentwood Center. We got those tablets as part of a grant, but we think that the computers were commandeered and given to students, but are now lost. We've reached out to our Dean for help, and are still waiting for aid in getting those tablets back.
 Responsible Parties and Timeline: Dean

FOR CTE PROGRAMS ONLY

1c. Community and Labor Market Needs (Link Ed Code 78016 (http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=EDC§ionNum=78016), Title 5, 51022 ([https://govt.westlaw.com/calregs/Document/I69DDDBCC0B6CB11DFB199EEE3FF08959C?viewType=FullText&listSource=Search&originContext=Search+Result&transitionType=SearchItem&contextData=\(sc.Search\)&navigationPath=Search%2fv1%2fresults%2fnavigation%2f0ad7140b000016c911a16d7fb7f969b%3fNav%3dREGULATION_PUBLICVIEW%26fragmentIdentifier%3dl69DDDBCC0B6CB11DFB199EEE3FF08959C%26startInDe](https://govt.westlaw.com/calregs/Document/I69DDDBCC0B6CB11DFB199EEE3FF08959C?viewType=FullText&listSource=Search&originContext=Search+Result&transitionType=SearchItem&contextData=(sc.Search)&navigationPath=Search%2fv1%2fresults%2fnavigation%2f0ad7140b000016c911a16d7fb7f969b%3fNav%3dREGULATION_PUBLICVIEW%26fragmentIdentifier%3dl69DDDBCC0B6CB11DFB199EEE3FF08959C%26startInDe)))

No Value

FOR CTE PROGRAMS ONLY

1d. Advisory Board Update and Analysis (CTE related only) Include dates of Advisory Board meetings in 2020-2021, and those completed or planned in 2021-2022.

No Value

Goals and Objectives	Modified	In Progress	Abandoned	Completed
Goal 1. Strengthen a culture of equity, diversity, inclusion, and racial justice. (District #2 and #4)				

Goals and Objectives			Modified	In Progress	Abandoned	Completed
Recommended Actions	Adequately staff the math department with full time faculty so that fifty percent of courses are taught by full time faculty.	0 linked SLOs 0 resource requests				
	Develop and expand our accelerated offerings through focused leadership, including student recruitment, curriculum, and professional development	0 linked SLOs 0 resource requests				
	Design and implement a programmatic effort to support under-served students, including but not limited to students of color and low income students; coordinate our effort with other campus projects.	0 linked SLOs 0 resource requests				
Goal 2. Increase and maximize equitable opportunities for students to successfully complete courses and programs. (District #1 and #2)						
Recommended Actions	Adequately staff the math department with full time faculty so that fifty percent of courses are taught by full time faculty.	0 linked SLOs 0 resource requests				
	Develop and expand our accelerated offerings through focused leadership, including student recruitment, curriculum, and professional development	0 linked SLOs 0 resource requests				
	Design and implement a programmatic effort to support under-served students, including but not limited to students of color and low income students; coordinate our effort with other campus projects.	0 linked SLOs 0 resource requests				
Goal 3. Increase opportunities that will prepare students to enter high-demand and living-wage occupational fields. (District #3)						
Recommended Actions	Redesign Geometry and Precalculus (trigonometry) preparation for calculus	0 linked SLOs 0 resource requests				
	Transform our use of instructional technology, with a potential shift away from calculators to computer/app based options	0 linked SLOs 0 resource requests				
Goal 4. To better support students in accomplishing their academic and career goals – from entry to completion/transition – and to enhance course-level and program-level achievement, expand and deepen educational, workforce, and community partnerships. (District #3)						
Recommended Actions	Adequately staff the math department with full time faculty so that fifty percent of courses are taught by full time faculty.	0 linked SLOs 0 resource requests				
Goal 5: Effectively utilize institutional resources to meet the needs critical to the College mission. (District #4 and #5)						
Recommended Actions	Have appropriate facilities resources to appropriately teach to our course outlines	0 linked SLOs 0 resource requests				

2. Vision for Success Goals Update : Version by Perrone, Maria on 11/15/2021 23:59

2a. The following table lists the *Vision for Success* indicators that we must align to as a College and as a District. Please look at your program data (Tableau) for each of the following *Vision for Success* indicators. Please address all indicators that are relevant to your program and provide a status update on your program goals from your Program Review Year Three Update. Please include action steps if your goal(s) has been modified and an explanation if your goal(s) has been abandoned. *

*NOTE - Please copy and paste the table below in your response and complete accordingly.

Vision for Success Indicators and ACCJC Indicator	Program Set Goals (from PR Year 3 Update)	Status (Indicate Modified, Completed, or Abandoned)	Timeline	Responsible Parties	Action Steps/ Explanation
Course Success					
Degrees (AA, AS, ADT)					
Certificates of Achievement					
Unit Reduction					

Strategic Initiative Report

CTE Jobs					
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Vision for Success Indicators and ACCJC Indicator	Program Set Goals (from PR Year 3 Update)	Status (Indicate Modified, Completed, or Abandoned)	Timeline	Responsible Parties	Action Steps/ Explanation
Course Success	64.5%	In progress	Fall 2023	Department Chair	The department will expand professional development to gateway courses (Math 110, 120, 140, 155 and 210) Design and offer teaching community with a focus on developing affective skills, metacognition and creating meaningful contextualized learning experiences. Use of supplemental instruction to students in Math 110, Math 140 and Math 155.
Degrees (AA, AS, ADT)	AS- 2 AST- 15	In Progress	Fall 2023	Math Department Math Department Chair	Re-new professional development for faculty teaching in STEM pipeline Collaborate with MESA coordinator and MESA counselors to inform students regarding AS and AST degree. Collaborate with Faculty teaching Math 250 and 230 to advertise Math AA to students.
Certificates of Achievement					
Unit Reduction	79				
CTE Jobs					

2b. The *Vision for Success Goal 5 - Equity* is designed to reduce the equity achievement gap on course success for disproportionately impacted (DI) student populations. The College has identified the following three disproportionately impacted (DI) populations: African-American, economically disadvantage students (low income), and foster youth students.

Please review your program data (Tableau) for each of the aforementioned DI populations, and provide a status update on your program goal(s) for your previously selected DI population(s) in your Program Review Year Three Update. If your goal(s) has been modified please include action steps and if your goal(s) has been abandoned please provide an explanation.*

**NOTE - Please copy and paste the table below in your response and complete accordingly.*

Course Success by DI Population	Program Set Goals (PR Year 3 Update)	Status (Indicate Modified, Completed or Abandoned)	Timeline	Responsible Parties	Action Steps/ Explanation
African American					
Low Income					
Foster Youth					

Course Success by DI Population	Program Set Goals (PR Year 3 Update)	Status (Indicate Modified, Completed or Abandoned)	Timeline	Responsible Parties	Action Steps/ Explanation
African American	54.5%	In Progress	Fall 2023	Math Department	<ul style="list-style-type: none"> Continue to support the UMOJA scholars program by providing the program with space and with designated Statistics sections. Expand UMOJA offerings to include Precalculus course. Develop professional development activities to help faculty create classroom environments that foster a sense of belonging. Communicate through interaction, class policies and materials that the instructor and Math program believes in each students ability to succeed.
Low Income	62.4%	In Progress	Fall 2023	Math Department	<ul style="list-style-type: none"> Develop professional development activities to help faculty create classroom environments that foster a sense of belonging. Setting and maintaining high expectations through effective pedagogy. Increase sections offering Zero Cost Textbooks. Use of supplemental instruction for students in Math 110, Math 140 and Math 155. Increase access to graphing calculators and increase use of low/zero cost software to improve content development.
Foster Youth	51%	Completed/Ongoing		Math Department	<ul style="list-style-type: none"> Develop professional development activities to help faculty create classroom environments that foster a sense of belonging. Develop professional development to help faculty Set and maintain high expectations through effective pedagogy.

3. Assessment Status Update and CSLO Assessment Effectiveness : Version by Magante, Maria on 10/15/2021 20:19

a. Please review the data provided on the assessment status of courses in your discipline for Cycle Two (2017/18-2020/21). For any courses that were not assessed in Cycle Two please list them in the table below in your response including why they were not assessed, when you are going to assess them, and who is going to assess them.*

*NOTE - Please copy and paste the table below in your response and complete accordingly (add extra rows if needed).

Course Name/ Number	Reason course was not assessed	When course will be assessed	Faculty Responsible for Course Assessment
Course Name/ Number	Reason course was not assessed	When course will be assessed	Faculty Responsible for Course Assessment
Math 220		Fall 2021	Perrone, Wolf, Gonzalinajec
Math 29		Fall 2021	Ramos, Guerrero-Gonzalez
Math 27		Spring 2022	Ramos, Guerrero-Gonzalez
Math 30		Fall 2021	Ramos, Guerrero-Gonzalez
Math 160		Fall 2021	Hubbard, Crawford
Math 240		Fall 2021	Hubbard, Crawford

b. Discuss the results of any CSLO assessments performed this year. What changes, if any, are planned to improve student success (ex. pedagogy, assessment instruments are not appropriate to measure, CSLO rewritten etc.)?

Upon reviewing our CSLO assessments, we identified that many of our students need to improve on communication and problem solving. Faculty should emphasize interpretation of concepts/graphs/equations in context, including using correct mathematical terminology and notation. We also recommend a more aggressive use of technology, including utilizing Canvas' different features and using graphing technology, in our math classes to highlight modeling and interpretation. In order to accomplish this goal, we need to continue offering professional development opportunities to our math faculty (ex: teaching communities, ordered-pairs) to improve pedagogy and to improve our curriculum by regularly auditing and editing our course packets. We also need to explore available technology to use in our math classes as many of our courses rely in technology as a way to solve, model or visualize a problem.

Math 26

Improvement Plan:

- For **CSLO#1**, the proficiency result went down from 17% to 9%. We propose to audit/edit assessment instruments such as lab assignments and other formative assessments, exams and other summative assessments to include more guided questions that will allow students to explain ideas, concepts and solutions in sentence form. Another alternative is to fund a cohort to develop a Geometry packet/module that correlates directly with LMC's course level outcomes. Also, we propose to continue funding ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices in Math 26.
- For **CSLO#5**, the proficiency result of the latest assessment went up from 16% to 22%. However, this may not be statistically significant progress. As such, we propose to audit/edit assessment instruments such as lab assignments and other formative assessments, exams and other summative assessments to include more guided questions that will allow students to explore application of concepts (e.g. logical arguments, spatial relationships, proofs etc.). We also propose to develop project-based assignments that will highlight this outcome. Another alternative is to fund a cohort to develop a Geometry packet/module that correlates directly with LMC's course level outcomes. Also, we propose to continue funding ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices in Math 26. Finally, MPT/Math Department explore the curriculum changes to adjust/include topics that complement STEM pipeline and Associate's Degree requirement.

Math 110S

Improvement Plan:

- For **CSLO#4**, the combined proficiency rate is 45% (6% HP + 39%P). We propose to adjust either pedagogy or type assessment to focus more on practical approaches/demonstrations using technology such as Statcrunch / online calculators to emphasize concepts in normal distributions and other related lessons. This can be done through audit/edit of lab assignments and other formative assessments. Furthermore, we propose that MPT committee regularly audit/edit the Math 110/110S packet to reflect adjustments to pedagogy/ approaches to CSLO#4. Also, we propose to continue funding teaching communities, ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices.
- For **CSLO#5**, the combined proficiency rate is 45% (6% HP + 39%P). We propose to adjust either pedagogy or type assessment to focus more on practical approaches/demonstrations using technology such as Statcrunch / online calculators to emphasize concepts in normal distributions and other related lessons. This can be done through audit/edit of lab assignments and other formative assessments. Discussion boards, Unit projects, and other similar formats will be beneficial in improving students' ability to further explain and correct concepts (through high-quality feedback etc.). Furthermore, we propose that MPT committee regularly audit/edit the Math 110/110S packet to reflect adjustments to pedagogy/ approaches to CSLO#5. Also, we propose to continue funding teaching communities, ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices.

Math 25

Improvement Plan:

For Math 25, we suggest to audit/edit packet in order to align with COOR. As such, we suggest to focus on the improvement of assessment instruments such as skills practice, problem solving process, scaffolding, manner of questioning, technology use etc. Some more suggestions include: (1) retaining best practices, (2)improving multiple representations, (3) balancing skills and explanation (instead of one or the other), (4) restating interpretation prompts to encourage students to produce the desired response. For Example, restating the prompt to include the context of the problem instead of a dry "find and Interpret" prompt, we believe, would help entice a better response. We also suggest the department/ MPT be funded to develop a better mentoring system to new faculty.

Math 12

Improvement Plan:

- For **CSLO#1 (Communication)**, proficiency rate is 25%. We propose to adjust either pedagogy or type assessment to focus more on a more "constructivist approach". The manner of questioning is important to highlight a more explanative nature of responses. Math 12 is heavy on skills but future assessment results may experience gain if simple skills-based questions are reworded into a more process -oriented approach. Questions that involve problem solving can include questions that are more open-ended such as, "What do you think is the most common source of error for this particular question? Explain why students would commit this mistake?". These types of questions explore misconceptions and may lead to a less mechanical memorization of steps but more of a deeper understanding of the material.
- For **CSLO#2 (Problem-Solving)**, the proficiency rate is 25%. We propose to adjust either pedagogy or type assessment to focus more on practical approaches/demonstrations using more approaches using Polya's method. This can be done through audit/edit of lab assignments and other formative assessments. The class can focus on the importance of problem-solving process and how it helps sort out misconceptions. Furthermore, we propose that MPT committee regularly audit/edit the Math 12 packet to reflect adjustments to pedagogy/ approaches to CSLO#2. Also, we propose to continue funding teaching communities, ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices.

Math 110

Improvement Plan:

CSLO #4:Modeling and Inference: the combined proficiency rate is 32% (15% HP + 17%P).

We propose to adjust either pedagogy or type assessment to focus more on interpretation of concepts/ graphs/ equation constants in the context pf the problem. This can be done through audit/edit of lab assignments and other formative assessments. We also propose a more aggressive use of technology such as Statcrunch / alternatives to highlight modeling and interpretation. Furthermore, we propose that MPT committee regularly audit/edit the Math 110/110S packet to reflect adjustments to pedagogy/ approaches to CSLO#4.

CSLO #5: Probabilities as it Relates to Statistical Inference: we notice that while the combined proficiency rate is 51%, only 8% performed above the minimum requirements. As such we suggest we propose changes in pedagogy/ assessment (like lab assignments, quiz, canvas homework etc.) to reflect more questions involving interpretation or reflection of inferential statistics concepts such as p-value, confidence interval meaning, etc. Furthermore, we propose that MPT committee regularly audit/edit the Math 110/110S packet to reflect adjustments to pedagogy/ approaches to CSLO#5.

Also, we propose to continue funding teaching communities, ordered-pairs, and workshops developed by the department and MPT committee to train instructors on best practices.

Math 210

CSLO #1:Students will be able to articulate generalized concepts of differential and introductory integral calculus, justify claims by citing course concepts, and evaluate both their own mathematical conclusions and those of classmates.

-Faculty will incorporate group and lab assignments which will focus on articulating concepts of differential calculus with context. Throughout the term faculty will incorporate group and lab assignments which help develop the communication of their conclusions, as well as identify relevant information and provide justification for steps used to solve the problem. For this, we would like to create and maintaining Math 210 Teaching Community meetings for faculty to create and share curriculum that allows for increased practice in communication.

CSLO #2:Students will be able to construct arguments using the theory of limits, continuity, infinity and infinitesimal measures and use these arguments to apply the concept of the derivative as a rate of change and the definite integral as an accumulated area.

-In the next assessment cycle faculty will update assessment tool to include theory on limits and continuity. As was the case with CSLO #1 faculty will work to develop communication skills by incorporating into lab assignments problems which prompt students to apply the concept of the derivative as a rate of change. In future assessment tools students should be provided with a way to interpret their results without a calculator, to accurately assess student understanding of definite integral as an accumulated area. Faculty have also begun to make great strides in our Online Canvas Platforms that allow for multiple interaction modalities that include discussions, asynchronous meetings, etc.

CSLO #3:Given functions in different representations, students will be able to select and apply appropriate strategies to find the derivative or anti-derivative and use technology and knowledge of graphs to verify that the derivative or anti-derivative found is an appropriate solution.

-Faculty teaching this course will incorporate DESMOS, Mathematica or Geogebra lab assignment to develop a graphical approach to verify anti-derivative and derivative solutions. For this, we would like to create and maintaining Math 210 Teaching Community meetings for faculty to inform themselves of innovative graphing utilities.

CSLO #4:Students will be able to apply differential calculus and introductory integration concepts to create and justify appropriate models of realistic (including scientific) scenarios, and determine the appropriateness and correctness of the results.

-Faculty will incorporate, as part of class examples, problems interpreting integral bounds in the context of the model. Labs and subsequent homework will also spend more time modeling and gauging the appropriateness of the selected models. Faculty suggest using group projects and student lead class presentations to develop calculus vocabulary.

4. Course Outline of Record Updates : Version by Perrone, Maria on 09/22/2021 23:40

Please review the data provided in eLumen for the status of the Course Outline of Records (COORs) in your discipline. Please indicate in the table below any COOR(s) for your discipline that has not been updated and identify the faculty member responsible for submitting the updated COOR(s) to the Curriculum Committee by November 1, 2021.*

*NOTE - Copy and paste the table below in your response and complete accordingly (add extra rows if necessary).

Course (Enter Course Name ex. ENGL-100)	Faculty Responsible for COOR Update

All COORs are up to date.

Impact of Resource Allocation