Course Title: MAT 204, Calculus II

Date: Fall 2018

Course Team: Christopher J. Lewis, Larry Wadel, Adrian Martin

Expected Learning Outcomes

Course Outcomes:
In this course students will acquire:

1) **TECHNICAL COMPETENCY** in the methods of calculus that will enable them to apply the various techniques of integration to evaluate indefinite, definite and improper integrals, and determine arc length, surface area and volume, as well as apply calculus to parametric and polar coordinate equations. Students will be able to apply a variety of tests to determine convergence/divergence of sequences and series. Students will also be able to represent functions by power series, determine intervals to convergence, and provide estimates of error. *(Supports Mathematics Program Outcomes 1, 2, 4 and 5)*

2) **CONCEPTUAL UNDERSTANDING** of the formulas, techniques and theory that are developed. Conceptual understanding will be reinforced from numeric, geometric, algebraic and written/verbal perspectives *(The Rule of Four)*. Students will be required to provide heuristic and visual justification of important results. *(Supports Mathematics Program Outcomes 1, 2, 4, 5, 6 and 7)*

3) **UTILITY** in the methods of calculus. Students will use calculus to solve applied problems from a variety of disciplines ranging from biology, economics, business, engineering, and the social sciences, but primarily focusing on applications from physics and mathematics. *(Supports Mathematics Program Outcomes 1, 2, 4, 5, 6 and 7)*

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)
Students demonstrate achievement of each outcome by scores on problems from AP Calculus BC exams that are correlated to the learning outcomes.

Validation (What methods have you used or will you use to validate your assessment?)
The mean score for HCC students for each problem is compared to the mean score of the AP Calculus BC test examinees. The comparison is reasonable since AP scores are used to determine college credit.

Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)
The results indicate that HCC Math 204-01 students were, in general, below average in ability to achieve learning outcomes, as compared to AP Calculus BC test examinees. This is in contrast to previous fall Math 204 classes, especially compared to Fall 2016, but consistent with the Fall 2017 class, which was also below average, but not as egregiously below average in questions 1 and 5. The text for Math 204 was changed to an open source text in Spring 2018. The below average scores may then be partly attributed to the text and to types of exercises in the text, which may not prepare students for AP type questions. However, of greater concern is the lack of motivation of the Fall 2018 students, a significant percent of which dropped the class.

**Follow-up** (How have you used or how will you use the data to improve student learning?)

The results indicate that more practice with utility problems that apply arc length formulas to calculate perimeter and revolution formulas to calculate volume would be beneficial to the students.

**Budget Justification** (What resources are necessary to improve student learning?)
Staff in the Learning Support Center able to conduct formal study groups in Math 204 students.
### Weakest Content Areas

<table>
<thead>
<tr>
<th>Item Analysis</th>
<th>SLO 3</th>
<th>SLO 3</th>
<th>SLO 3</th>
<th>SLO 3</th>
<th>None</th>
<th>SLO 1, 2 &amp; 3</th>
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*% Walk-away Fs = Did not take the final exam and received a grade of F.

** Common Comprehensive Component of the Final Exam provided and analyzed on the COG.

### Course: MAT 204  
### SLOA Data

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