

Restructuring of Calculus II to Better Serve the STEM Courses

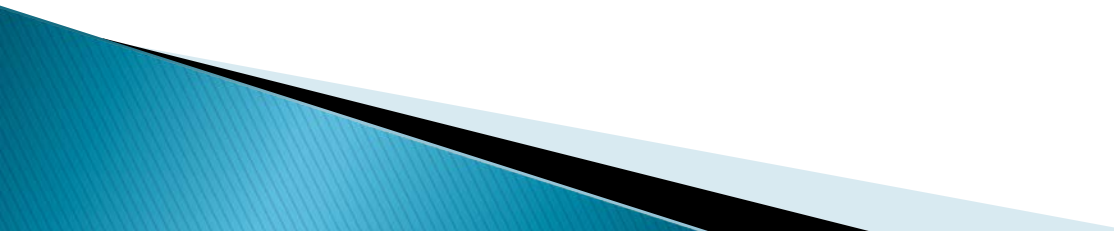
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RISE, Summer 2017



Main Goal

- ▶ The main goal of this proposal was to restructure math 2070 by using applications and terminology found in the STEM courses which have a prerequisite of math 2070, Calculus II.

Rationale

- ▶ The passing rate was approximately 50%
 - ▶ Mathematical deficiencies in STEM courses were discussed in SERG meetings
 - ▶ A course required for many STEM degrees:
 - Chemistry ACS, Biochemistry, Chemistry Dual Degree
 - Physics, Physics Dual Degree Engineering
 - Computer Science Dual Degree Engineering
 - Mathematics
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Plan – Components

- ▶ Solicitation of input from faculty in the STEM courses (MAPS) – Completed
 - Dean Richardson and Jessica Graber in Physics
 - Jian H. Zhang in Chemistry
 - Vljako Kocic in Mathematics
- ▶ Development of a Handbook – in progress
 - Learning objectives and goals – done
 - Suggested practice problems – done
 - Worked problems – done
 - Supplemental problems with solutions
 - Practice test with solution key

Plan – Components

- ▶ Development of a WebAssign course – Completed
 - E-book
 - Lecture notes
 - Scored practice tests
 - Graded homework
- ▶ STEM related group projects – in progress
 - Input from STEM faculty
 - Discipline specific
 - Conceptual understanding of course concepts

Plan – Components

- ▶ Assessment
 - Course passing rates: (including “W”)

Spring 2015 – 85%

Fall 2015 – 64%

Spring 2016 – 73%

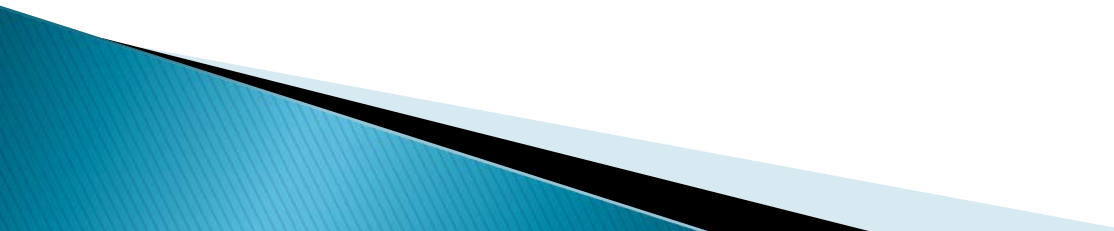
Fall 2016 – 64%

Spring 2017 – 85%

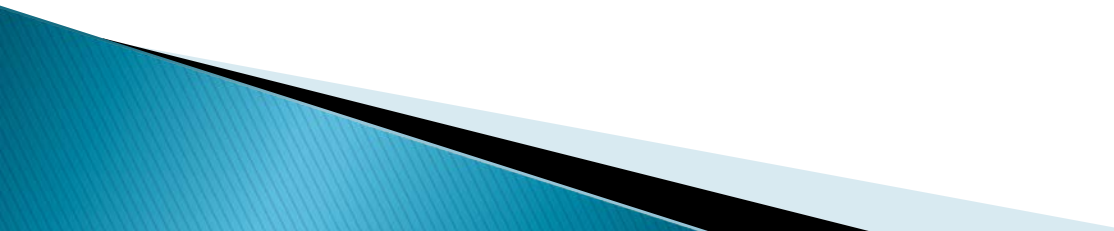
Plan – Components

- Student performance in subsequent courses
In progress
- Student survey:
 - See appendix (Only given Spring 2015)
- Conceptual understanding of group projects
In progress

Problems Encountered

- ▶ We miscalculated the time to complete all aspects of the project.
 - ▶ Daily Quizzes required more class time than expected.
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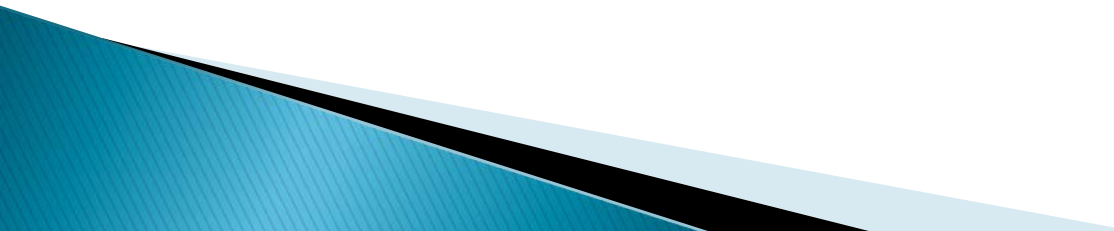
Future Plans

- ▶ Complete the handbook
 - ▶ (Summer 2017, expected completion date)
 - ▶ Create the discipline specific projects
 - ▶ Continue monitoring the course
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Plans for Dissemination

- ▶ We will work with Dr. Coston to determine the best journal to submit our findings as well as the best conferences to present our findings.

Appendix– Survey

- 100% of the students surveyed found the online homework very useful or useful.
 - 80% of the students surveyed found the daily quizzes very useful or useful.
 - 93% of the students surveyed found the instructor's lecture notes very useful or useful.
 - 100% found the online homework helped to master the course skills.
 - 87% found the instructor's lectures helped to master the course skills.
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Appendix

- 86% found the daily quizzes helped to master the course skills.
 - 94% found there were enough online homework problems.
 - 93% found the course beneficial.
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