Name: Roger M. Goldwyn

Department Name: Mathematical Sciences College: ['SC']

Course number: MAC 2262

Course Title: Introduction to Calculus with Applications

Course Term 1: ['Fall'] - 200 students in all sections.

Course Term 2: ['Fall'] - 200 students in all sections.

Is this course WAC Certified? ['No']

Are multiple sections offered? ['Yes']

If yes, is there a common syllabus? ['Yes']

If there is no common syllabus, how will the department/program maintain consistency of content and objectives?

Foundations of Mathematics Course Description- Provide a course description that conveys the general content of the course, and identifies methods of instruction (e.g., lectures, modeling, event experiences, discussions, small groups, simulations).

This course will provide an overview of the salient math topics most heavily used in the core sophomore-level STEM courses. These include algebraic manipulation of equations, trigonometry, vectors and complex numbers, sinusoids and harmonic signals, systems of equations and matrices, differentiation, integration and differential equations. All math topics will be presented within the context of applications, and reinforced through extensive examples in lecture and homework assignments. Some assignments are worked in class.   Students are supported by engineering teaching assistants (Learning Assistances=LAs) who will work with the instructor on problem selection and how to interact with students.

Describe the purpose of the course.
The course has two main objectives: (i) increase student retention, motivation, and success in engineering and other STEM areas through an application-oriented, hands-on introduction to mathematics; (ii) replace traditional mathematics prerequisites taken before MAC 2311. This represents a shift from math prerequisite requirements to an emphasis on STEM motivation for math, as well as ensuring preparation for success in MAC 2311.

For the following Foundations of Math (IFP Area #2) student learning outcomes:

- **Describe explicit connections or linkages between the SLO and teaching/learning experiences (e.g., assignments, teaching methods, events, projects, displays, performances).**
- **Explain how the outcome will be measured including a clear path for collecting and analyzing the data.**
- **Describe how performance will be evaluated (e.g., rubric, sub-tests, ratings--as related to specific learning outcomes).**

Learning outcome #1: *Students will demonstrate an understanding of mathematical theories and their applications.*

Teaching-learning experiences include lectures, videos, homework and chapter specific exams that involve applications from the STEM field exploring topics such as straight lines, quadratics, and trigonometry. Multiple course modules use and reinforce these skills. Students will be assessed on this outcome through constructed-response items embedded in the cumulative final exam (e.g., solve the problem). Items will be used to create a score for each student specific for this learning outcome.

Learning outcome #2: *Students will be able to identify and apply mathematical concepts most appropriate to solving quantitative problems.*

The use of lectures, chapter videos, and chapter specific homework and exams will be used to address this learning outcome. These involve applications requiring multiple techniques and course modules including sinusoids, vectors, and an introduction to calculus. Students will be assessed on this outcome through constructed-response items embedded in the cumulative final exam (e.g., solve the problem). Items will be used to create a score for each student specific for this learning outcome.

Learning outcome #3: *Students will display quantitative literacy.*

Lecture, chapter videos, and chapter specific homework assignments and exams will be used to meet this learning outcome. Students will be required to demonstrate the formulation of a physical problem in mathematical terms and obtain a meaningful solution. These skills are widely reinforced throughout all modules in this course. Students will be assessed on this outcome through constructed-response items embedded in the cumulative final exam (e.g., solve the problem). Items will be used to create a score for each student specific for this learning outcome.