

# Kennesaw State University STEM Student Success Initiative

## I. INTRODUCTION

Kennesaw State University is proposing an integrated approach for improving student success in STEM courses and degree programs. We believe that an approach that integrates advising, uses common pedagogies across the curriculum, implements high-impact practices as detailed by the Association of American Colleges and Universities, and that has an outcomes focus will lead to improvement in student outcomes in our courses and in our programs. Because every student regardless of major at the University must also take one course (3-4 credits) in Area A2 (math skills) and 2 courses (7-10 credits) in Area D (Science, Mathematics and Technology), improving student outcomes in science and mathematics courses will have a material impact on the progression and graduation rates for the entire University, particularly students seeking degrees in STEM and STEM education.

The Kennesaw State University STEM Student Success Initiative will address the following USG STEM Initiative Goals:

- Goal 2. Improve performance and retention in STEM core courses and majors; and
- Goal 3. Increase the number of qualified K-12 STEM teachers.

## II. INSTITUTIONAL MISSION AND STUDENT BODY PROFILE

For more than 50 years, Kennesaw State University has been known for its entrepreneurial spirit and sense of community. Offering campuses in Marietta and Kennesaw, the university is located just north of Atlanta and combines a suburban setting with access to one of the country's most dynamic cities. As Georgia's third-largest university, Kennesaw State offers more than 150 undergraduate and graduate degrees, including a growing doctoral program. Designated by the Board of Regents of the University System of Georgia as a comprehensive university, Kennesaw State is committed to becoming a world-class academic institution positioned to broaden its academic and research missions and expand its scope on a local, regional and national level.

On January 6, 2015, the Board of Regents of the University System of Georgia approved the consolidation of Kennesaw State and Southern Polytechnic State University. This represents the USG's fifth and largest consolidation in its continuing commitment to increase efficiencies and effectiveness to better serve students and the state. The new Kennesaw State University combines the best from two of Georgia's most respected institutions in higher education. A comprehensive university, Kennesaw State is a destination campus offering students a broad spectrum of quality academics, a growing and vibrant campus life, award-winning dining facilities, and a wide array of athletic offerings. With nationally ranked degrees in business, engineering and first-year programs, as well as premier teaching, nursing, architecture, science and math programs, the new Kennesaw State University is poised to become Georgia's next world-class institution.

## III. PROJECT DESIGN

The KSU STEM Initiative proposes to address this student success challenge and help KSU address our Complete College Georgia goals by (1) implementing pedagogical changes known to increase student success in these gateway courses, (2) creating a culture of interdisciplinarity in all of our courses, (3) restructuring our courses and laboratory experiences around student engagement with the material and discovery, (4) creating a common first-year experience for students majoring in STEM disciplines that focuses on developing quantitative reasoning skills, and (5) developing a robust advising structure that

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helps students find a pathway for success that fits their individual needs. Over the 5-year time-frame that we propose to implement this initiative, we will assess our successes, and make adjustments as needed.

This strategic initiative has 5 areas of emphasis:

- A. **Create a School of Integrative Science Learning.** This school will (i) coordinate the teaching of all gateway courses around common pedagogies, (ii) be the home of STEM 1101, a proposed first-year seminar that is structured around quantitative skills and the interdisciplinarity of science, (iii) coordinate the training of peer teachers who will be integral in helping other students achieve success in the gateway courses, and (iv) coordinate faculty professional development that focuses on creating innovative and successful teaching and learning instructional environments.
- B. **Data Driven advising and placement of students** into a curriculum pathway that fits their preparation. Historical data shows that student success in particular courses can be correlated with High School GPA, SAT quantitative reasoning scores, and having taken AP courses in High School. We have created a predictive model based on this historical data that will be used to advise students on a curriculum pathway where they can be most successful.
- C. **Creation of a STEM 1101 – Freshman seminar** focused on quantitative skills and the interdisciplinarity of science. This will be a common experience for all entering students who plan on majoring in STEM disciplines, will be focused on developing fundamental skills needed to be successful in mathematics and science disciplines, and will be the first part of a 4-year process for giving all STEM majors an authentic research experience.
- D. Create **alternate pathways within the high DFW courses.** Despite the high DFW rates for these gateway courses, our predictive model suggests that 22% of the students enrolled in these courses have a level of preparation that suggests that they are at risk for a D, F or W grade. Use of the predictive model provides a mechanism for identifying at risk students and providing support to these students early in their KSU studies. Alternate pathways include (i) sections that include recitations and that incorporate peer teaching, and (ii) course sequences that present the material in a more deliberate 2-credit 3-semester sequence.
- E. **Scaffolding research/discovery experiences throughout a student's program of study** to guide students from beginning scientist to research collaborator, culminating in a capstone undergraduate research experience.

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