

# A Pilot LA program in Calculus and Physics in Support of Engineering at WIU-QC

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## Abstract:

We are proposing to introduce a Learning Assistant program at WIU-QC in the introductory Physics and Mathematics courses that serve our Engineering program. This proposal was developed as a result of the University's participation in the HLC's Persistence and Completion Academy.

Our working hypothesis is: *"If we decrease the DFW rates in the foundational courses for the Engineering program, we will see an increase in persistence overall at WIU and completion of the Engineering major in particular."*

The main focus of our 3 year pilot will be on the benefits derived by the LA's themselves, and on their impact for students with deficiencies in math and scientific reasoning by providing the extra attention they need to succeed, persist, and complete the Engineering program.

## The Engineering Program:

- Prerequisite to all engineering coursework is a solid understanding of Calculus and Physics
- BS in Mechanical Engineering or BS in Engineering with a Civil, Electrical, Industrial, Robotics or Traditional emphasis
- Sr. Design Projects often completed with industrial partners such as The John Deere Co.
- NCEES Fundamentals of Engineering Exam required for graduation
- 160 majors: 50% 4 yr and 50% transfer students
- The pilot, if approved, will be funded from Engineering foundation dollars

## Data:

TABLE 1 Engineering cohort

Cohort Term	Total Students	Average ACT	Average Transfer GPA at Entry	Course Deficiency at Final Grade Percent	Average WIU GPA after First Semester	Percent Retained Second Year
Fall 2013	49	24.4	3.036	27.66%	2.455	63.27%
Fall 2014	45	25.1	3.065	19.55%	2.722	66.67%
Fall 2015	23	25.7	2.952	30.77%	2.554	47.83%
Fall 2016	22	25.9	3.228	16.00%	3.086	0.00%

TABLE 2 Quad Cities cohort

Cohort Term	Total Students	Average ACT	Average Transfer GPA at Entry	Course Deficiency at Final Grade Percent	Average WIU GPA after First Semester	Percent Retained Second Year
Fall 2013	321	22.4	3.047	16.50%	2.915	74.38%
Fall 2014	267	23.1	3.040	17.79%	2.809	70.41%
Fall 2015	257	21.9	2.898	27.08%	2.621	68.87%
Fall 2016	213	22.7	3.023	17.84%	2.870	0.00%

TABLE 3

Cohort Term	Total Students enrolled in Math 133	Percent of Students who Completed Math 133 with a C or better
Fall 2013	7	71.40%
Fall 2014	18	61.10%
Fall 2015	14	35.70%

TABLE 4

Cohort Term		
Fall 2013	no data	no data
Fall 2014	26	80.80%
Fall 2015	18	61.10%
Fall 2016	20	80.00%

## Pedagogy Course:

- Learning Assistants will be recruited from high performing and engaging Engineering students
- The pedagogy course will be delivered as a 1 SH "Special Topics" course
- It will be taught in the fall semester
- It will be mandatory for first time Learning Assistants
- Learning Assistants will receive a scholarship to cover the cost of the course, as well as a wage for hours worked
- The course will also be open to other students interested in the topic of pedagogy

## Planning Sessions:

- Each semester, 4 Learning Assistants will serve one calculus class and one physics class, two per class
- Class sizes are ~25
- The planning sessions will be conducted together, so that not only will the faculty and LA's be able to coordinate pedagogy, but also help coordinate content

## Active Learning Classrooms:

- Classes will emphasize problem solving and presentations of solutions to the class
- Subject content will be presented through readings, lecture notes, and videos