

**Needed Math**: *Targeted Research to Identify Mathematics Competencies and Align Mathematics Education for Skilled Technicians in Advanced Manufacturing.* 

The Needed Math project has been funded by the US National Science Foundation (NSF) Advanced Technological Education program and is being conducted from September 1, 2021 to August 31, 2024.

## **INTENDED OUTCOME**

The major outcome will be an improvement in the alignment of the mathematics that is taught at the community college level, with the mathematics industrialists perceive to be necessary for manufacturing technicians (not engineers or scientists) to be successful in the workplace.

## SITE VISITS

We are learning about the needed math through on-site and virtual visits to manufacturing companies where we tour the facilities, learn about the companies, observe technicians at work, and talk to them and supervisory personnel about the skills they need and the math that they actually use. These visits are planned collaboratively with our contacts at each company to ensure that we meet with the right mix of people, fit into the workday with minimal disruption, meet company guidelines, and identify appropriate questions to ask.

## **SURVEY ITEMS**

We are using examples from the visits and from other sources (including expert colleagues, course syllabi, and certification exams) to develop industry-vetted survey items reflecting math encountered in the workplace. We are using these items to survey a large sample of industrialists and two-year college technical and mathematics faculty—and ultimately to enhance conversations among them—related to the mathematics truly needed by the technicians.

We will distill the survey responses to identify what mathematics is deemed to be most important. What will be of great interest to us and many others will be a comparison of the responses to see where there is consensus—and where significant differences occur—between the surveyed groups of educators and industrialists. We believe that industry needs should influence the way mathematics is taught in two-year college technical programs and we hope to be able to provide compelling data for educators who design instructional programs to draw upon.

From the items rated most important by survey participants, we will construct scenarios to illustrate the varied uses of mathematics that arise in typical manufacturing settings. Educators will be able to utilize the scenarios to demonstrate the utility of mathematics to their students and illustrate their breadth of application.

## **COLLABORATIVE WORKING GROUPS**

To disseminate and sustain the work, we will share research results with Collaborative Working Groups across the country. These groups include employers, educators, representatives of organized labor, and government agencies. A member of our management team will liaise with each group. The groups will suggest ways in which mathematics reform based on local and regional needs and constraints, can occur in their local areas to better align instruction with industry needs.

For further information, please contact the project Principal Investigator: Michael.hacker@hofstra.edu