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July 27, 2020

# DELIVERing a ReVAMPed Vacuum Technology Program: Poster Presentation

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Vacuum Technology for Employment Readiness (DELIVER)

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Bloomington, MN



This work was made possible in part by a  
grant from the **National Science Foundation**  
(ATE DUE #1700624; DUE #1400408)



**NORMANDALE**  
COMMUNITY COLLEGE

# Why is Vacuum Technology important in Micro and Nano Technology?

Vacuum pressure conditions (sub-atmospheric pressures) provide a clean and stable environment which makes possible various forms of high-tech manufacturing and research.

Vacuum technology is especially important in thin film deposition applications. Thin films are defined as surface coatings with thicknesses ranging from a few nanometers to 100 micrometers.

Technicians maintain and support vacuum systems in industrial and research settings.

# Where is Vacuum Technology used?

- Semiconductors (electronics)
- MEMS, LEDs, Solar cells
- Glass coating (tinted glass)
- Tool coating (TiN coated drill bits)
- Packaging coating (snack chips)
- Fixture coating (faucets)
- Characterization tools (SEM)
- Wide varieties of research (Hadron collider)

## **Abstract:**

Normandale Community College (Bloomington, MN) has received two NSF-ATE project grants since 2014:

- DUE #1400408 (Revising Vacuum technology, an Advanced Manufacturing Program, ReVAMP), and
- DUE #1700624 (Distance Education and Learning In Vacuum Technology for Employment Readiness, DELIVER)

Over the course of these two projects the PI team at Normandale updated its (a) Vacuum and Thin Film Technology **course curriculum**, (b) **hands-on learning resources**, and (c) **course delivery modalities** to more readily offer the program to students at distance locations.

As a result, the number of students served annually has grown from 31 student enrollments across four (4) Vacuum Technology classes in AY 2015 to 135 student enrollments across 10 Vacuum Technology classes in AY 2020.

# DELIVERing a ReVAMPed Vacuum Technology Program



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**Workforce Challenges**      **★ Anywhere Technical Education ★**      **Project Outcomes 2015-20**

Advanced manufacturing and research      Custom      Recruited new students to Vac Tech courses

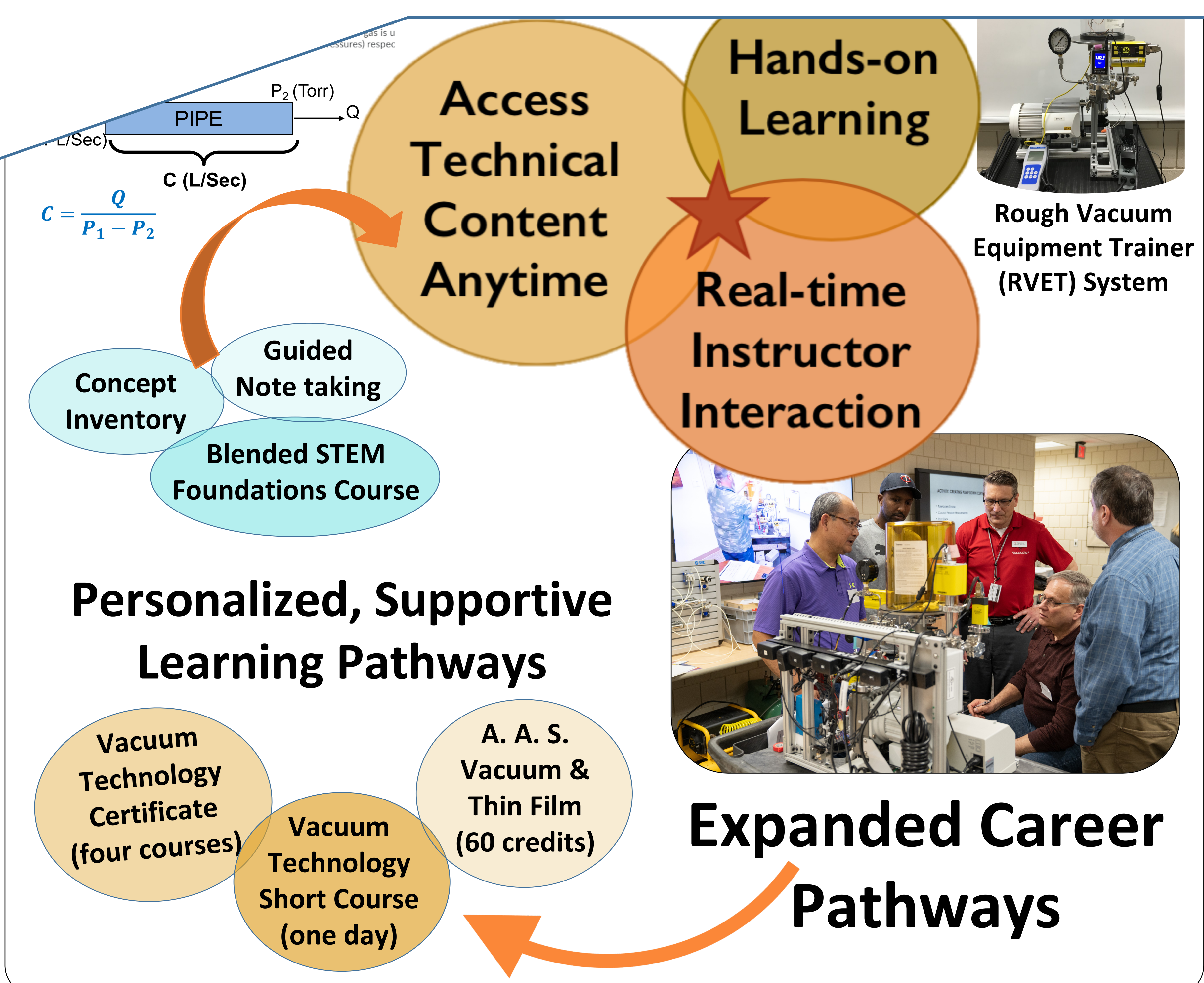
## TO DO...

- (1) Expand program enrollment strategies**
- (2) Continue curriculum validation activities**
- (3) Create a stable instructional talent pool**

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in engineering technology ed  
- **Jobs requiring vacuum tech**  
are a niche in advanced  
- **Regional need is un**  
across the U.S.  
Small class  
vacuum tech  
y education programs  
**TO DO... Increase enrollments**  
- Expand the pipeline of new students  
- Recruit & train more vac tech instructors  
- Educate a distributed workforce

**Proposed Solution**  
 Goal: Offer a high-value, highly accessible credential in vacuum technology through the strategic use of distance learning modalities to prepare skilled technicians for work in industries that rely on vacuum-enabled processes.  
**Project DELIVER: Distance Education and Learning In Vacuum technology for Employment Readiness (DUE #1700624)**



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sive  
ce  
- 16 vacuum-reliant businesses  
- 3 academic institutions (4-yr and 2-yr)  
- 1 national lab  
- 54 students attain Vac Tech Certificate

**Learn More**  
 Contact Nancy Louwagie  
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<http://www.normandale.edu/vacuumtechnology>

**Acknowledgements**  
 This work was made possible in part by a grant from the **National Science Foundation** (ATE DUE #1700624; DUE #1400408)  
 Acquisition of equipment and supplies made possible in part from multiple in-kind donations and funding matches from the Minnesota State Leveraged Equipment Program

# Project DELIVER (#1700624)

## No-cost extension year (2020-21)

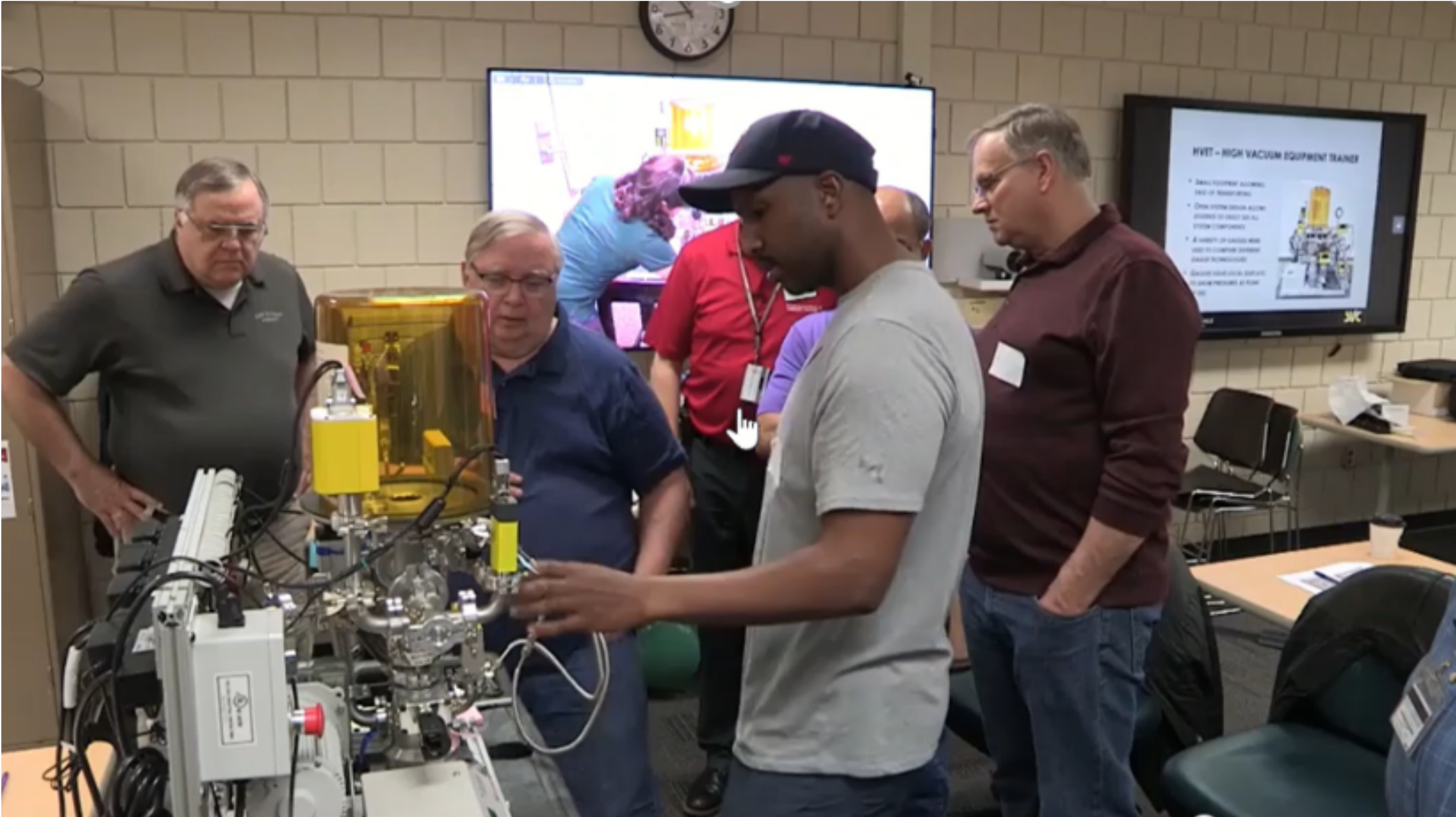
- **Recruit participants for a focus group** who will:

- Review the vacuum and thin film technology curriculum
- Observe vacuum technology classes
- Provide feedback on the vacuum and thin film technology program
- Develop strategies that address recruiting and sustaining an instructional talent pool to ensure on-going program success

- **Enroll more students and offer all the vacuum technology classes**

- Support incumbent workers; attract more traditional college students; develop a high school pipeline strategy
- Continue to improve active learning class components

# Telepresence and VET video



# Who benefits from Vacuum Technology classes?

- Aspiring or practicing maintenance technicians (primary)
- Operators (primary)
- Pre-engineering students
- Engineers
- Maintenance, production, laboratory supervisors
- Vacuum technology sales representatives
- High school students\*

\*Experience to-date with MN Post-secondary Education Option students; maybe HS co-hort better approach?



# Enroll students in Fall 2020 VACT classes! Participate on the DELIVER project focus group team!

Virtual focus group activities will commence in September and continue through April 2021. Stipend awards available to the participants.

Normandale Community College is offering all four (4) VACT classes fall semester 2020. More distance students welcome to enroll!

Contact Nancy ([Nancy.Louwagie@normandale.edu](mailto:Nancy.Louwagie@normandale.edu)) for more information about being part of the focus group or registering for fall Vacuum Technology classes at Normandale.

***THANK YOU!***