NCPN Connect 2021 Conference: Enhancing Workforce Readiness of Students in Technician Education Programs

NSF ATE Grant #1902075: 2019 - 2022
Increasing the Number of Workforce-Ready Engineering Technicians in Southeastern Pennsylvania

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Workforce Development Certifications
Non-Credit Technician Training:
Metalwork Training
Industrial Maintenance
Business and Industry Connections: Manufacturing

Certifications for Credit

Formalized Collaboration: Workforce Readiness

Manufacturing within Design

Technician Education
For-Credit Degree Programs:
Leading to an AAS Degree in
Engineering Technology
Business and Industry Connections: Manufacturing

Susan Herring

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Co-PIs: Ms. Susan Herring, Executive Director of Center for Workforce Development, Bucks County Community College
Ms. Tracy Timby, Interim Vice President of Strategic Partnerships, Bucks County Community College
Dr. Vladimir Genis, Professor Emeritus of Engineering Technology, Drexel University

Goal #1: Enhance Our Engineering Technology Curriculum:

Industry Needs:
Soft Skills Training and Career Exploration within College Success Seminar and Business Courses

Focus on Workforce Readiness

Technical Electives:
(1) Students Choose from Different Concentrations to Satisfy Diverse Needs of Industry

(2) Center for Workforce Development Certifications Count for College Credit

AAS 2193 Engineering Technology (Occupational)
DEGREE COURSE REQUIREMENTS

Course	Credits	Course	Credits
CHEM121 Chemistry I [A,B,6,7]	4	MATH125 Precalculus Mathematics [A,B,6]	4
COLL101 College Success Seminar	1	MGMT135 Business Comm. [A,B,2,4,10]	3
COMM110 Effective Speaking [A,B,4,5]	3	MGMT155 Introduction to Entrepreneurship [2]	3
ECON111 Principles of Economics-Macro [2,3,8]	3	PHYS106 Physics A [A,B,7]	4
ENGR112 Engineering Design [A,B,9]	4	PHYS107 Physics B [A]	4
ENGT222 Applied Engineering Statics [A,B]	3	Arts/Humanities [H,1]	3
ENGT240 Applied Circuit Analysis [A,B]	4	Computer Science Elective [A,C]	3-4
MATH115 Elementary Statistics [A,B,2,6]	3	Technical Electives [D, E, F, G]	12
		Total	61 – 62*

** If a student chooses to take the 18 credit capstone semester in nanotechnology at Penn State, the total number of credits for the major will be 67-68. The semester sequence for the nanotechnology majors will be also different due to the capstone semester at Penn State.*

[A] Course requires a prerequisite or co-requisite.
[B] Placement Testing Required.
[C] Choose any CISC course except for CISC100.
[D] Choose from BIOL121, BIOL228, BIOT105, BIOT125, BIOT225, BRFS101, BRFS102, BRFS201, CHEM122, CISC110, CISC113, CISC115, CISC119, CISC128, MATH140, SCIE103, SCIE104, SCIE105, VAFW100.
[E] Certifications from Center for Workforce Development, internships, and prior work experience may be approved for credit.
[F] You may take 18 directed electives for the nanotechnology certification through Penn State as engineering technology electives.
[G] Must be approved by the Dean of STEM.
[H] Choose any course from the approved list.

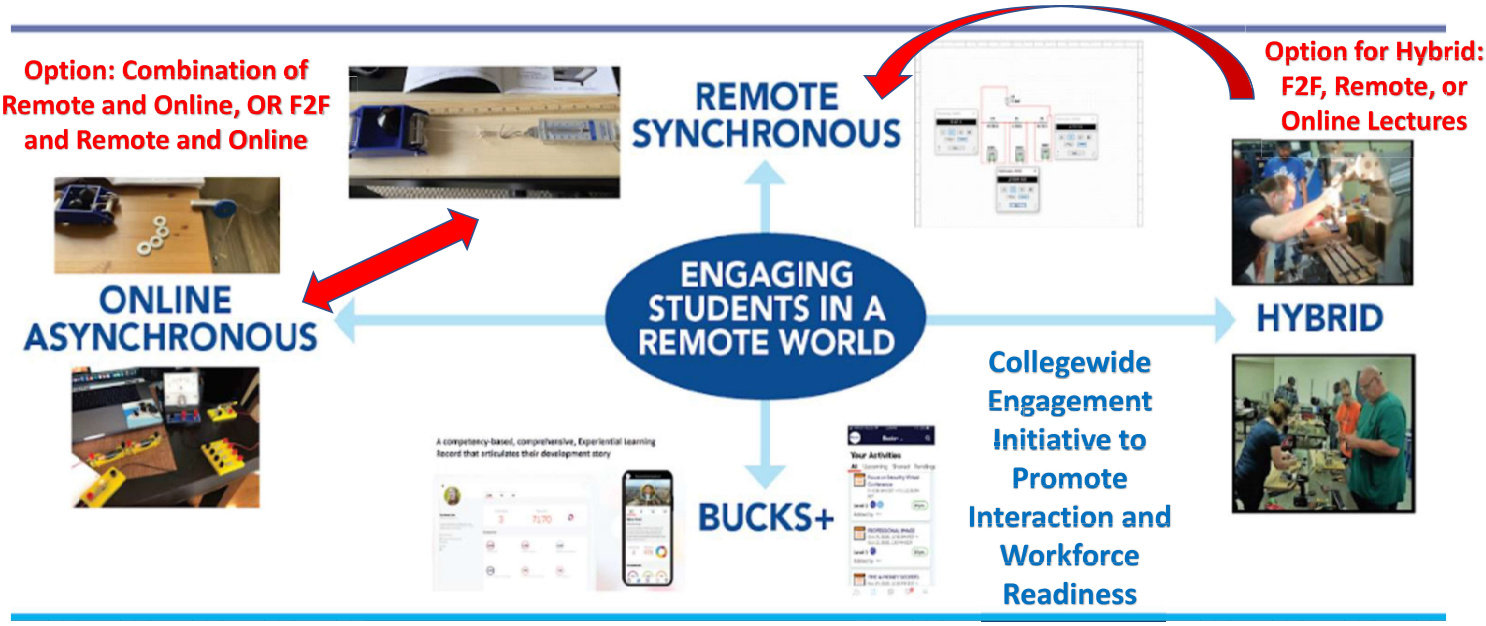
[1] *Satisfies Arts/Humanities.*
[2] *Satisfies Critical Thinking.*
[3] *Satisfies Diversity.*
[4] *Satisfies Information Literacy.*
[5] *Satisfies Oral Communication.*
[6] *Satisfies Quantitative Literacy.*
[7] *Satisfies Scientific Literacy.*
[8] *Satisfies Social Sciences.*
[9] *Satisfies Technological Competence.*
[10] *Satisfies Writing.*

Our enhanced engineering technology major allows students to choose from many concentrations within manufacturing that align with industry needs.

More than Just Face to Face (F2F) Classes:

We Offer Many Options for Engaging Students in a Remote World

(Different modalities for Courses and a Collegewide Engagement Program)



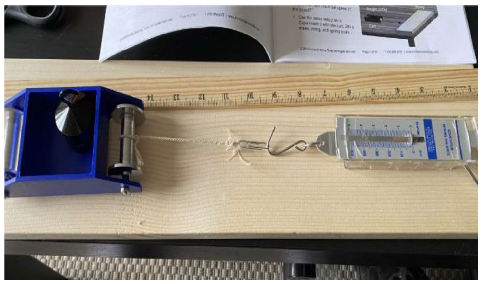
Teaching Students in a Remote World….

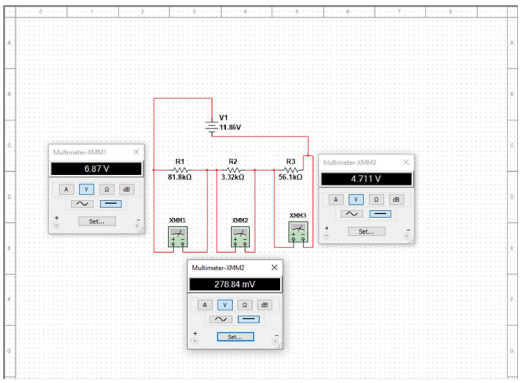
- ***Interactive Discussions as an Assignment!***
  - Creates a ***classroom*** atmosphere
  - Solidifies student ***confidence*** that they are not alone
  - Cultivates ***friendships, conversations,*** and working groups
- ***Regular Schedule of Assessments***
  - Keeps them ***organized***. Provide a schedule and hold them to it.
- ***Regular Communication through Quick Turn Around***
  - Answer questions, ***provide feedback***, and remind students regularly to ***be strong and work hard***

Remind them: *We are all in this together!*

Laboratory in a Remote World

- ***At home laboratory kits and projects***
  - ***Hands-on experience*** at home
  - ***Interactive discussions:*** create a group setting and cultivate a classroom atmosphere



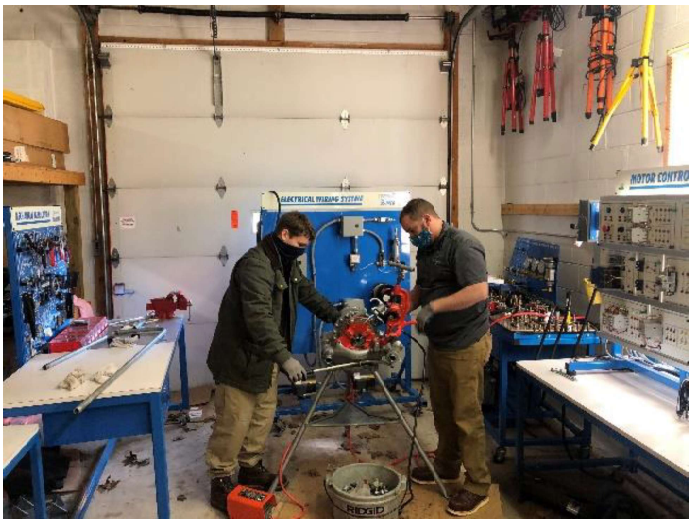


- ***Industry grade software***
  - Create ***simulations*** and ***models***
  - Perform mathematical ***calculations***
  - ***Troubleshoot*** and ***analyze***

The Outcome: Workforce Readiness of Our Students

Center for Workforce Development:
Industrial Skills Pre-Apprenticeship Training Programs
Adapting Hands-on Training to a Remote World





Metalwork Training **and** ***Industrial Maintenance*** **Pre-apprenticeship Training Programs**

Industrial Skills Training Programs

- Entry-level Electro-Mechanical Technician and CNC Machine Operator Jobs
- 320 Trained
- 90%+ Placement Rate
- Avg starting rate: $16 to $20/hr
- Over 70 Manufacturing Partners
- Employability skills, site tours

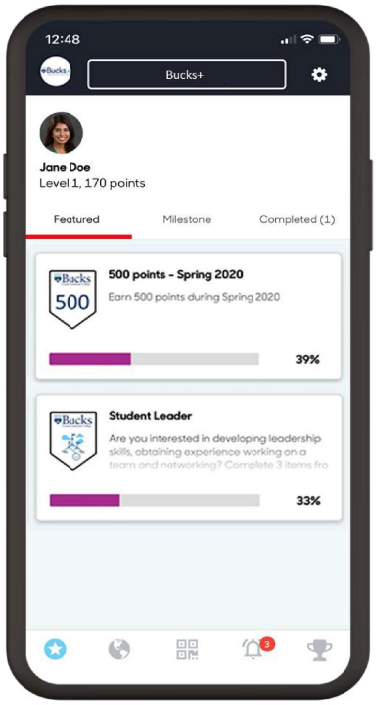
Adapting to Hybrid Instruction

- Virtual information sessions and aptitude assessments
- Students loaned laptops for 12-week program:
  (AutoCAD™, Amatrol™, Cengage™ online)
- 'Tool Kits', books and laptops provided in-person orientation
- Tool kits include measurement tools (dial and digital calipers, micrometers, rulers, etc.), pliers, wire stripper, screwdrivers, drill
- Synchronous instruction - Zoom™, 2 days online, 3 days shop
- Virtual company tours
- Job placement activities 1:1 via zoom

Engaging Students Across the College in a Remote World:

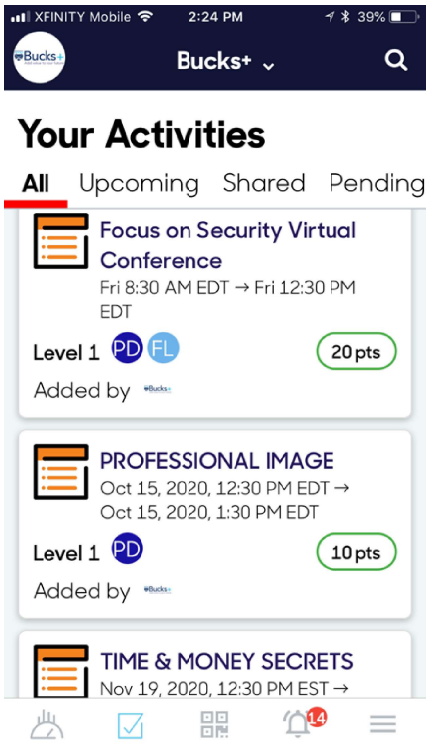
What is Bucks+?

It is a competency based experiential learning record that articulates their developmental story



1. **Mobile first** technology
2. **Easy** for students to understand
3. **Gamified awards** system helps to build habit
4. Ability for **Bucks to brand** the experience – Bucks+
5. **Connection** between opportunities and competencies that employers value

Why Bucks+?



Employers want to see Initiative!

Four Categories of Development to Cultivate Workforce Readiness:

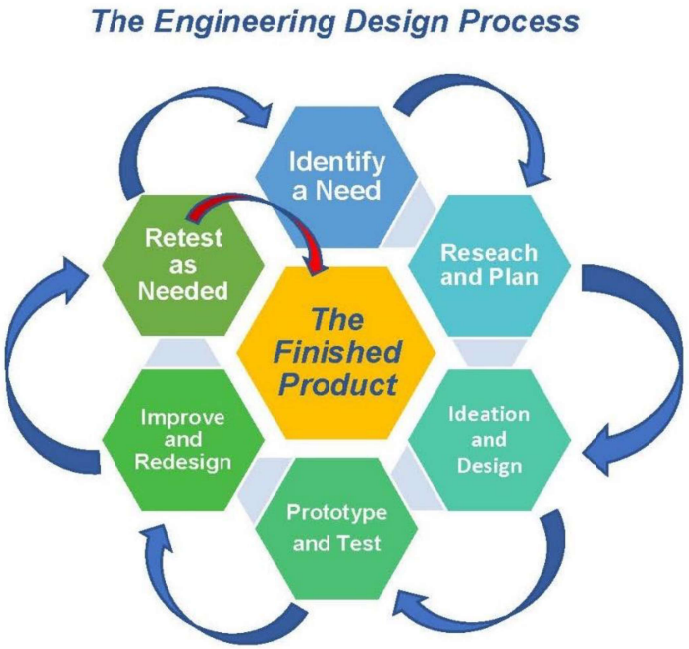
- Personal and Professional Development
- Financial Literacy
- Global and Cultural Awareness
- Community Engagement

Bucks+ is Required in our College Success Seminar

Goal #2: Enhance our Engineering Design Course to Include Hands-on Manufacturing

- **Laboratory time** dedicated to hands-on **training** on the equipment*
  - **Assignments include teamwork utilizing the Engineering Design Process to solve industry-related problems**
- **Instructional training and tutorial videos** on use of the equipment*

*Additive and Subtractive Manufacturing Equipment includes: **twelve 3D printers, laser cutter, three CNC cutters, manual lathe and milling machine**



Goal #3: Develop a Plan to Recruit Students from Underrepresented Groups into Technician Education Programs

Who are these students???

- Minority populations
- Students from a lower income household
- Students of low socioeconomic status
- Students of groups with lower higher education participation
- Female Students
- Veterans and Spouses of Veterans
- Underserved Populations
- Students with Disabilities
- Mature Students

Some Initial Ideas to Help Us Prepare for our Professional Learning Communities….

Advertise, advertise, advertise!!

Let everyone know the programs we have to help students achieve!!

But where? ***Social Media!!*** (Reach out to Different Groups)

Younger students: Social Media… Where else??

Mature students: Facebook, Newspaper, Postal… Where else??

Reach out to school districts with a higher percentage of underserved and underrepresented students

Enlighten students to STEM through ***outreach initiatives*** such as offering ***STEM related videos*** that highlight design and manufacturing!! (Send them to schools)

Offer Students our newly developed ***Summer Bridge Program*** that promotes college readiness and student success!

Contact administrators to spread the word and to recommend students

Christine Delahanty

Presenter's Contact Information

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Susan Herring

Websites and Resources:

Bucks County Community College (Bucks) Website: https://www.bucks.edu/

NSF ATE Grant 1902075 Bucks Website: https://www.bucks.edu/academics/department/stem/engineering/nsf-grant/

Bucks Engineering and Engineering Technology: https://www.bucks.edu/academics/department/stem/engineering/

Bucks Center for Workforce Development: https://www.bucks.edu/workforcedevelopment/

Summer Bridge Program at Bucks: https://www.bucks.edu/calendarnews/releases/name-82377-en.html

Drexel University Engineering Technology:
http://catalog.drexel.edu/undergraduate/collegeofengineering/engineeringtechnology/