

Updating Florida's ET Career Pathways for I4.0

NSF DUE #2148138 (2022-2024)

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MANUFACTURING IN FLORIDA

- Florida manufacturing's impact on the state's economy surpassed the contribution to Gross Domestic Product (GDP) of many other key industries – tourism, agriculture, and transportation.
- Florida's manufacturing output (GDP) has **grown from \$43.5 billion in 2014 to \$73 billion in 2022**, a 67.8% growth rate over 9 years. This rate of growth has significantly outpaced all other leading manufacturing states.
- Florida's manufacturing employment reached **422,800** in September 2023, passing both Georgia and New York to become the **10th largest state** in the country for manufacturing employment.
- Manufacturing employment has grown by **23.3%** since **2014**, significantly higher than other leading manufacturing states.

*Florida Commerce 2023 Florida Manufacturing Report
<https://www.floridajobs.org/docs/default-source/communicationsfiles/2023-florida-manufacturing-report.pdf>



FLATE will drive Florida's world-class manufacturing workforce education and training.



Impact locally. Lead nationally.

FLATE Outreach and Recruitment Resources



Menu
[HOME](#) [ABOUT US](#) [PROJECTS](#) [COMMITTEES](#) [PARTNERS](#) [NEWS](#) [EVENTS](#) [VIDEOS](#) [ENGINEERING](#) [TECHNOLOGY](#) [EDUCATION](#) [CONTACT](#)

Welcome to FLATE



The Florida Advanced Technological Education Center (FLATE), a National Science Foundation Center of Excellence in high-technology manufacturing, is the go-to organization for manufacturing and advanced technical education, best practices and resources supporting the high performance skilled workforce for Florida's manufacturing sectors. FLATE provides exemplary industry partnerships, workforce opportunity, and educational synergy throughout the state of Florida by connecting industry and workforce needs to targeted educational endeavors at many community and state colleges across Florida.

Made in Florida

FLATE has built a web portal for students in middle and high schools where they can learn about the wonderful, profitable opportunities in considering manufacturing as a career choice. Every day, we enjoy things that many people don't realize were made in Florida. Behind every product and technology we use, there is a world of manufacturing. Today, in Florida, more than 20,000 different companies and 380,000 people work in the manufacturing field. The site has areas of information and resources for students, educators and industry. Visit MadeInFlorida.org



www.madeinforida.org

Welcome to

www.
www.flate.pbwiki.com

Lead Locally.
 Impact Nationally.

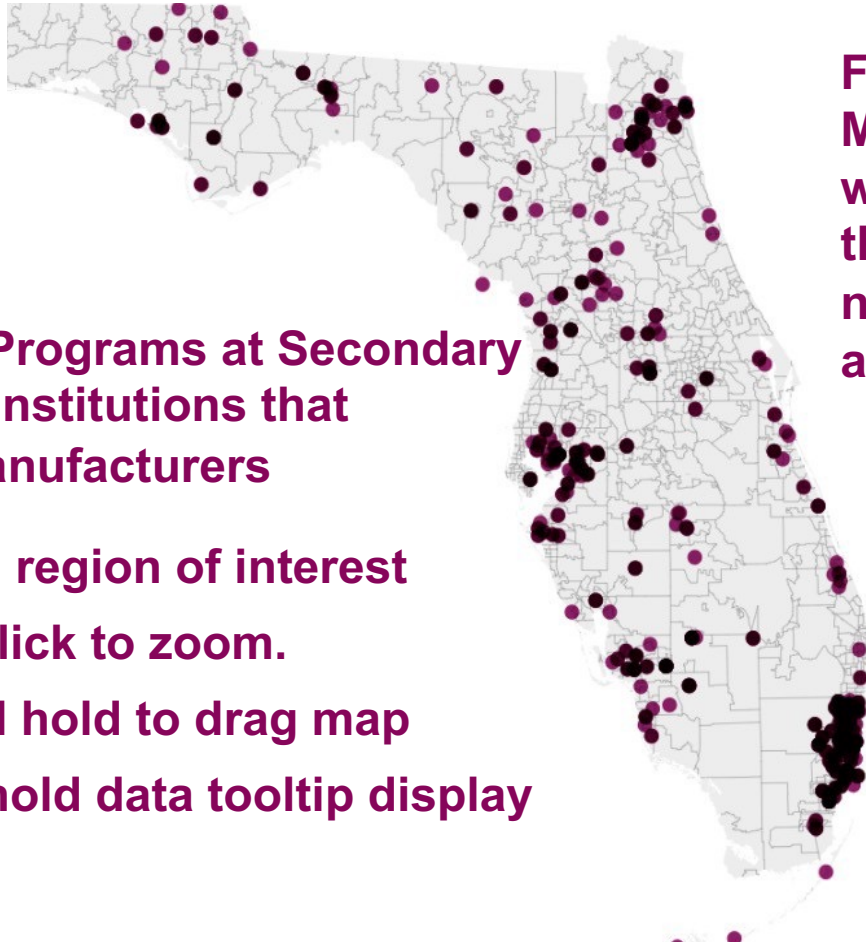
(CLICK ON IMAGES BELOW)

<p>Made in Florida STEM Lesson Plans</p> <p>For Elementary, Middle & High School Educators</p>	<p>Career Planning Resources</p>	<p>Modules for Advanced Technological Education</p>	<p>The Toothpick Factory</p> <p>A Simulating Game for Soft Skills</p>	<p>Student Activity Sheets</p>
<p>Industry Tour Resources</p>	<p>WOMEN IN MANUFACTURING Resources for Girls</p>	<p>FLATE Presentations, Meetings & Webinars</p>	<p>Professional Development Opportunities for all Educators</p>	<p>Camp Resources</p>
<p>FLORIDA MFG 2022</p> <p>Making Manufacturing Careers. #FLMFG2022</p>	<p>STEM Summer Camps</p> <p>Robotics & Energy Car Resources for everyone</p>			

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NEW FLATE RESOURCE: MANUFACTURING MATTERS FLORIDA DATA DASHBOARD



Academic Programs at Secondary Education Institutions that Support Manufacturers

- Hover on region of interest
- Double click to zoom.
- Click and hold to drag map
- Click to hold data tooltip display

FLATE, a NSF Center of Excellence and NIST supported MEP outreach center, provides industry partnerships, workforce opportunities, and educational synergy throughout Florida by connecting industry and workforce needs to targeted academic endeavors at many community and state colleges across the state.

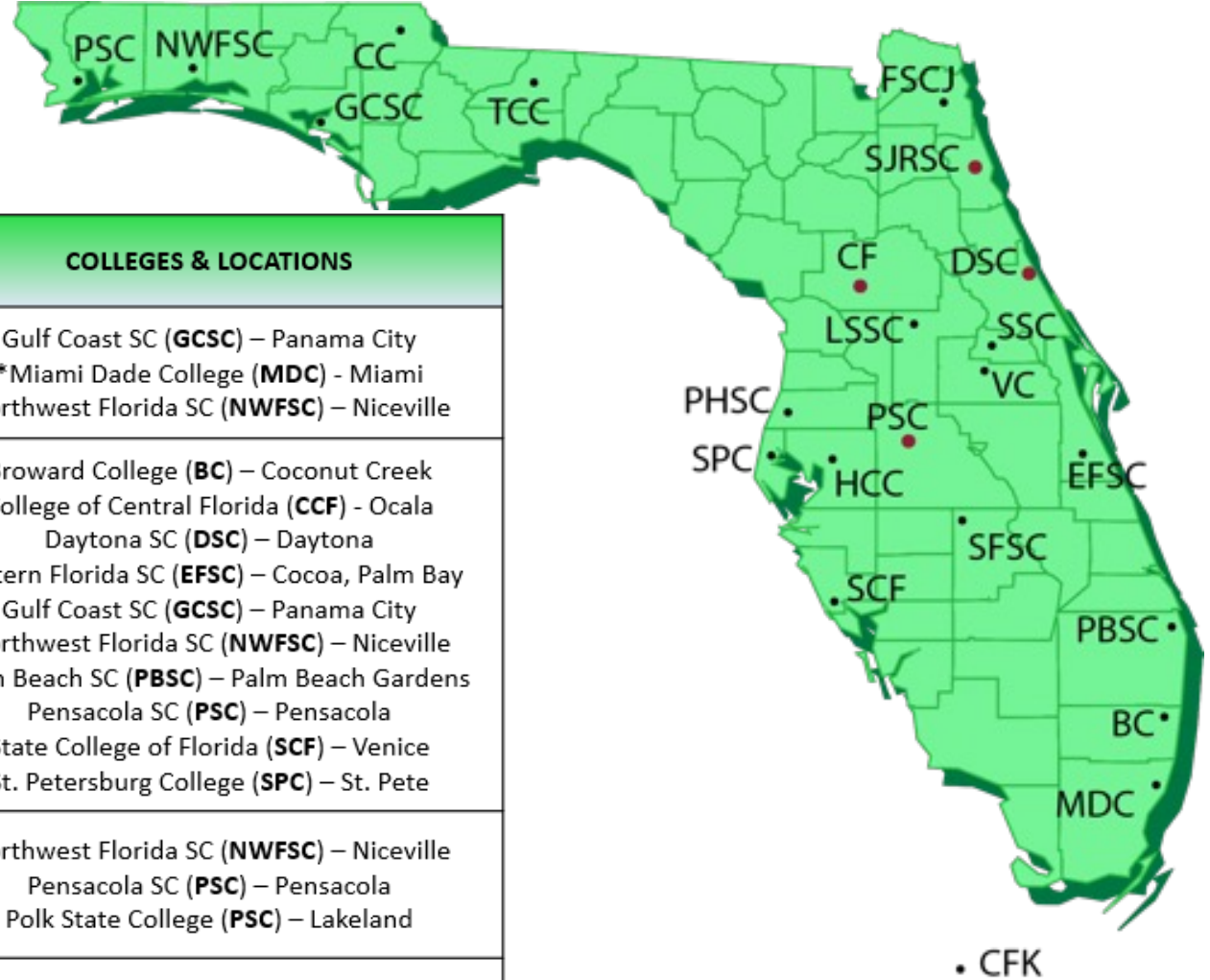
FLATE works with non-profits, educational institutions, including Universities, high schools, technical schools school districts and manufacturers.

FLATE's "Manufacturing Matters in Florida" is a tool to highlight manufacturing education, careers, industry and their impact on Florida's economy.

<http://fl-ate.org/dashboard/>



FLATE's ET College Network



*11 ET SPECIALIZATIONS	23 COLLEGES & LOCATIONS
Advanced Manufacturing (Mechatronics)	Broward College (BC) – Coconut Creek Chipola College (CC) - Marianna College of Central Florida (CF) – Ocala Eastern Florida SC (EFSC) – Cocoa, Palm Bay Florida SC (FSCJ) – Jacksonville Gulf Coast SC (GCSC) – Panama City Hillsborough CC (HCC) – Tampa *Miami Dade College (MDC) – Miami Palm Beach SC (PBSC) – Palm Beach Gardens Pasco Hernando SC (PHSC) – New Port Richey Pensacola SC (PSC) – Pensacola Polk SC (PSC) – Lakeland St. Johns River State College (SJRS) – Orange Park St. Petersburg College (SPC) – Clearwater South Florida SC (SFSC) – Avon Park Tallahassee CC (TCC) – Tallahassee Valencia College (VC) – Orlando
Advanced Technology	Eastern Florida SC (EFSC) – Cocoa, Palm Bay Northwest Florida SC (NWFSC) – Niceville Palm Beach SC (PBSC) – Palm Beach Gardens
Alternative Energy	College of the Florida Keys (CFK) – Key West Palm Beach SC (PBSC) – Palm Beach Gardens State College of Florida (SCF) – Venice
Biomedical Systems	Broward College (BC) – Coconut Creek
Digital Design & Modeling	Daytona SC (DSC) – Daytona Northwest Florida SC (NWFSC) – Niceville State College of Florida (SCF) – Venice St. Petersburg College (SPC) – Clearwater

ET SPECIALIZATIONS	COLLEGES & LOCATIONS
Digital Manufacturing	Gulf Coast SC (GCSC) – Panama City *Miami Dade College (MDC) - Miami Northwest Florida SC (NWFSC) – Niceville
Electronics	Broward College (BC) – Coconut Creek College of Central Florida (CCF) - Ocala Daytona SC (DSC) – Daytona Eastern Florida SC (EFSC) – Cocoa, Palm Bay Gulf Coast SC (GCSC) – Panama City Northwest Florida SC (NWFSC) – Niceville Palm Beach SC (PBSC) – Palm Beach Gardens Pensacola SC (PSC) – Pensacola State College of Florida (SCF) – Venice St. Petersburg College (SPC) – St. Pete
Mechanical Design & Fabrication	Northwest Florida SC (NWFSC) – Niceville Pensacola SC (PSC) – Pensacola Polk State College (PSC) – Lakeland
Protection & Control Technology	Lake Sumter SC (LSSC) – Leesburg
Quality	College of Central Florida (CF) – Ocala St. Petersburg College (SPC) – Clearwater
Supply Chain Automation	College of Central Florida (CF) – Ocala St. Petersburg College (SPC) – Clearwater



CONTACT FLATE

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Updating Florida's ET Career Pathways for I4.0

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GOALS

ASET
Advanced
Automation

NEW!

BS
Industrial
Engineering
Technology

Update
Curriculum

SETIAB

Engaging
Industry

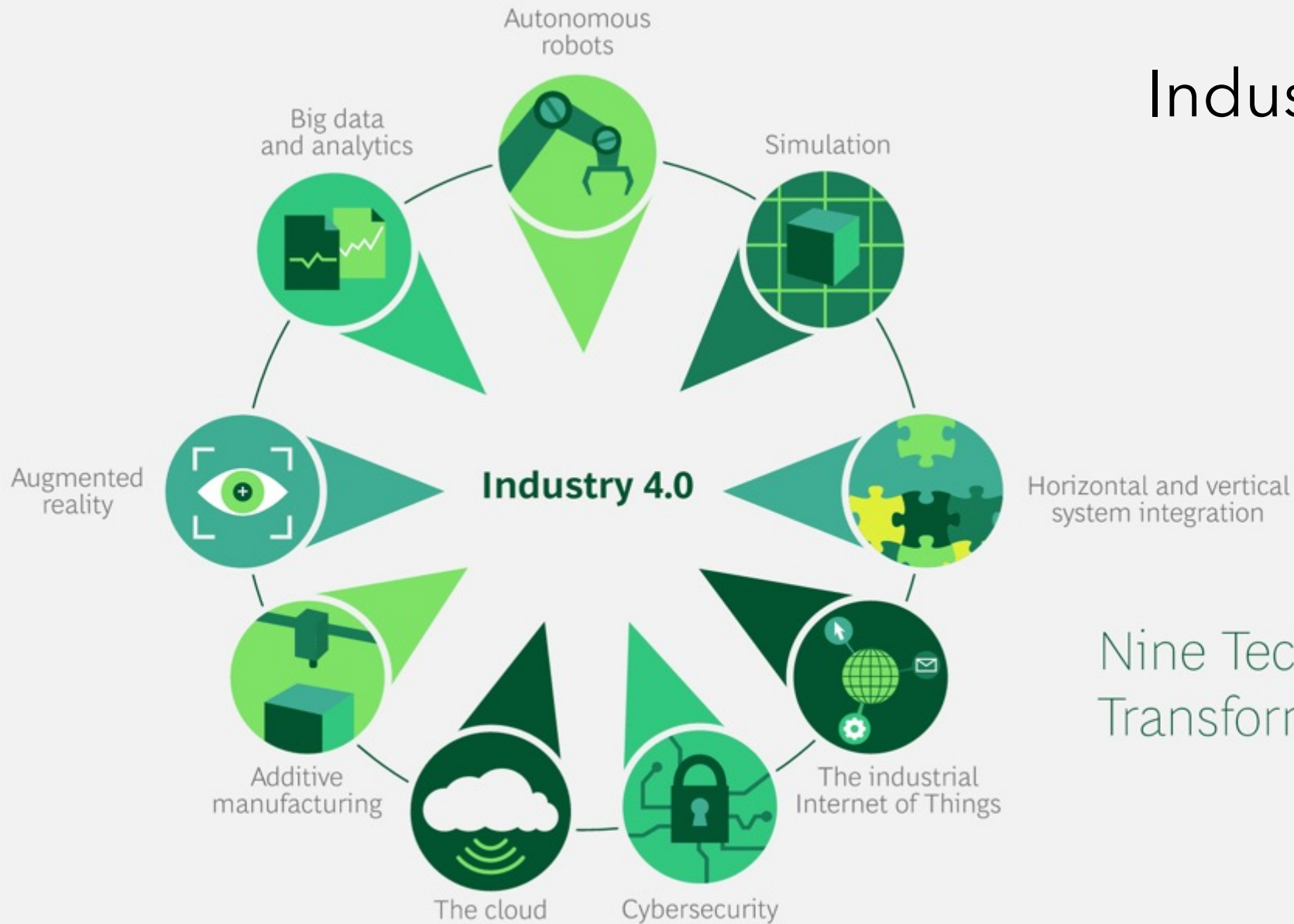
Professional
Development
for Educators

Professional
Development



Industry 4.0 Technologies

Production Technician Skills



Nine Technologies Are Transforming Industrial Production

Skills Gap and Updating to I4.0

- NSF Future of Work Caucus I Grant
 - Developed to meet the skills gap needs of small to medium manufacturing industries
 - Questionnaire developed and disseminated to 133 manufacturers and 26 college educators on technical skills gap moving toward I4.0
 - 37 essential skills were identified
 - 6 categories were identified to cover the 37 skills
 - 5 of 15 skills areas were selected
 - Analyzed by two pathways
 - FLDOE Frameworks Alignment
 - 5 Critical Crosscutting Skills



5 Critical Crosscutting Technician Skills - in all categories

CATEGORIES	
Interpersonal skills	System Integration
Problem Solving - quality	Prototyping
Problem Solving - maintenance	Big data and analytics

5 Crosscutting Skills Found in all Categories	
1	technician involvement with engineering
2	critical thinking
3	integrating systems
4	interdisciplinary skills
5	diagnostics and understanding the full process

Skills **not** in the A.S. E.T. Advanced Manufacturing Frameworks

BIG DATA AND ANALYTICS

technician involvement with engineering

critical thinking

data integrity

awareness of security requirements

data interpretation

integrating systems, PLCs

basic understanding of databases /networks

cloud

interdisciplinary skills

human factors & interactions

diagnostics & understanding the full process

WHY?

Future Research

SKILLS MISSING in the FDOE Framework Standards

data integrity

data interpretation

basic understanding of databases & networks

cloud

QUESTIONABLE - assumed from standards or might need more and more clarity

data interpretation

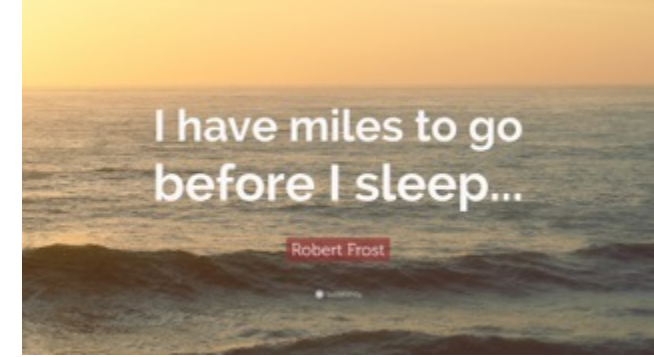
building/ assembling prototypes

integration of engineering tech/advanced manufacturing
mfg/computing

interdisciplinary skills

write technical reports and data

Implementing Change



EDUCATION OPTIONS

- 2-year program reviews are every 3 years (state level)
- College Credit Certificate
- Special topic electives

SPECIFIC TRAINING OPTIONS

- Interact with FloridaMakes to meet manufacturers needs
- Education equipment suppliers
- OEM training



Skills Gap and Updating to 14.0

- NSF Future of Work Caucus II Grant
 - Developed from Caucus I - Address the missing skills (skills gap)
 - Initially develop College Credit Certificates (CCC) to cover gap
 - Approve and implement the CCC through FLDOE for use at the colleges
 - Develop a statewide industry board for ASET programs to help guide curriculum changes and continue meeting industry needs



Not So Fast!

- Identified issues
 - New CCC would requires additional courses
 - Not all colleges teach the courses or are teaching these areas
 - Lack of staffing to teach a new CCC
 - Expertise?
 - The identified areas requires a level of cyber security
 - Cyber security requires additional IT courses (up to and additional 12 credit hours)
 - Existing ASET course are limited to 60 credit hours
 - What level of skill do CCC verses AS technicians verses BS need
 - What level can a technician perform in data collection, analysis, and presentation
 - Each manufacturer/Industry has different levels for CCC, AS, and BS



Solution

- Develop an ASET specialization
 - Max 60 hours
 - Implement skills for basic data collection, integration, analysis, cyber security
 - OT operations verses IT (to edge computer)
 - Articulate to BSIET
- BSIET
 - Articulate from ASET
 - Implement Cyber security
 - OT works with IT (edge computer to cloud)
 - Advanced data collection, integration, analysis



ASET - Advanced Automation Standards

12. Understand, operate, troubleshoot, and maintain automated systems.
13. Collecting and processing data from automated systems
14. Identify, implement and/or interpret data collected from automated systems.
15. Apply the principles of programmable logic controllers and human machine interfaces. and robotics to automated systems.
16. Apply the principles of industrial networking to automated systems.
17. Understand fundamental programming used in networked systems.
18. Understand the basic concept of cyber security.



ASET - Advanced Automation Courses

<u>Courses</u>	<u>Credits</u>
Gen. Ed.	15
ET Core	18
Specialization Core	
ETM2401 - Mechanical Devices and Systems	3
ETS1700 - Hydraulics and Pneumatics	3
ETS1540 - Industrial Applications Using PLCs and Robotics	3
ETI1843 - Motors and Controls	3
ETS1542 - Introduction to PLCs	3
ETS1535 - Automation Process Control	3
COP1010 - Fundamental Programming	3
Program Electives - Choose two	6
ETS2531 - HMI Interface and System Graphics	
ETS2536 - Control Systems and Networking	
ETS2650 - Industrial Networking	
Total	60



BSIET - Industrial Engineering Technology

BSIET Specialization New Courses

Operations Research

Manufacturing Process Engineering

Probability and Statistics for Engineers

Programming for Engineers



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GOALS



Update
Curriculum



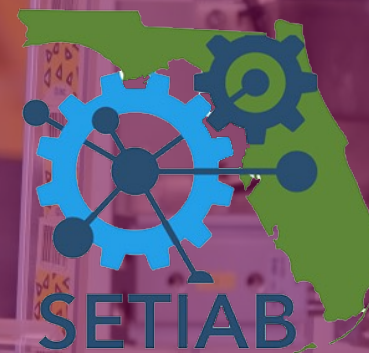
Engaging
Industry



Professional
Development



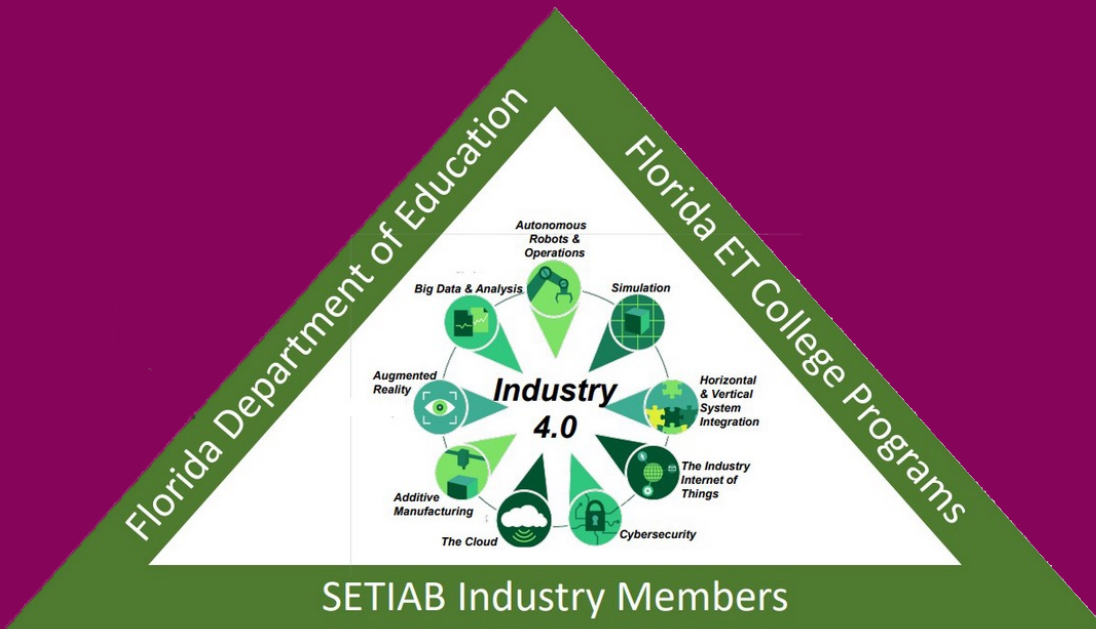
FLORIDA
STATEWIDE ENGINEERING TECHNOLOGY BOARD
FLATE.SITE/SETIAB



OVERVIEW

The Florida SETIAB is a key vehicle in engaging and building in-roads between Florida manufacturers and colleges offering two and four-year degrees in engineering technology.

MISSION



- Ensure the 20-plus A.S.E.T degrees offered across community and state colleges in Florida are meeting rapidly evolving industry needs
- Raise the visibility and competencies of A.S.E.T. degree graduates
- Assist the Florida College System in identifying SMART (Specific, Measurable, Attainable, Realistic, and Timely) goals by ensuring ET curriculum learning objectives and activities are productive and of high quality



PURPOSE & IMPACT

- Identify **core curriculum standards** that support local/state industry and economic development needs
- Identify the core structure of **technical training** for ET graduates
- Identify required **components of short-term continuing education** for incumbent employees utilizing college and industry resources, on-job-Training, Internship, and Co-op programs
- Identify **required components of lifelong fundamentals skillsets**
- Provide **guidance on education and industry pathways for career growth** for students/employees
- Provide **guidance for enhancing and aligning career and technical training** with industry trends



SETIAB BOARD MEMBERS

- Industry representatives who each support one of the state college ET advisory boards
- Member from FloridaMakes
- Representatives from the K12 education system in Florida and
- Member from the Florida Department of Education's Adult and Career Education Division
- Supporting Members

Supporting Members

- Members from each college with an industry member
- A representative from FLATE



SPONSORSHIP

The sponsor of the SETIAB is FloridaMakes, in coordination with the Florida Advanced Technological Education Center (FLATE). FloridaMakes is the official representative of the Manufacturing Extension Partnership (MEP) in Florida, a program of the National Institute of Standards and Technology, an agency of the Department of Commerce. FLATE's mission is to increase the quantity, and quality of collaborations in curriculum development, reform, and dissemination, faculty professional development opportunities, recruitment, and outreach activities. FLATE will facilitate efforts between the Florida Department of Education (FLDOE), Florida's Engineering Technology programs, Engineering Technology Forum, FloridaMakes Network, and the State Engineering Technology Advisory Board (SETIAB).

SETIAB BOARD: OFFICERS



Way Campos
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(Gulf Coast State College)



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Technology Deployment Group, Inc.
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FL DOE



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Palletone/Health Management Associates
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Coca Cola
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Jessica Lovette

Volusia Manufacturers Association
(Daytona State College)



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Machine Technology Inc
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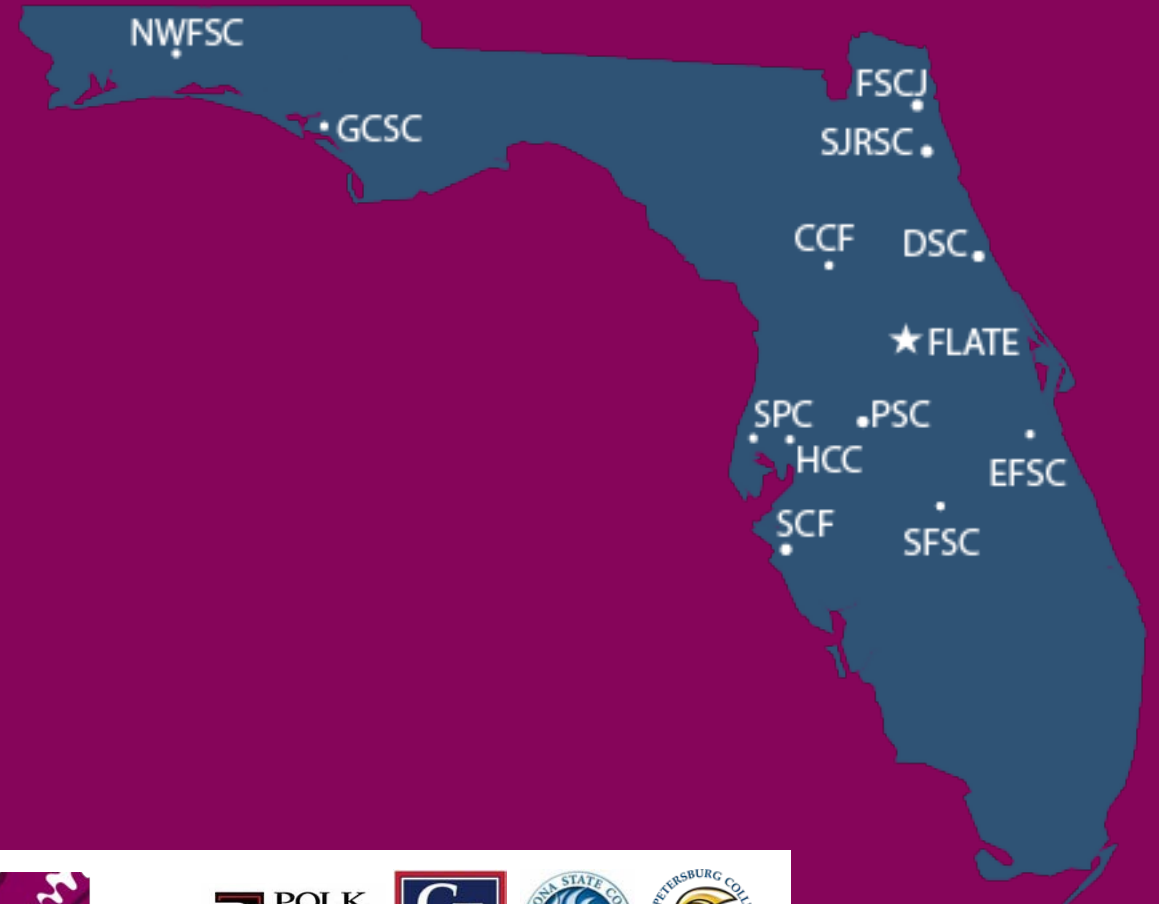


James Gillard

SR People Operations
(St. Johns River State College)

STATE COLLEGES WITH INDUSTRY REPRESENTATIVES

- College of Central Florida
- Daytona State College
- Eastern Florida State College
- Florida State College at Jacksonville
- Gulf Coast State College
- Hillsborough Community College
- Polk State College
- Northwestern Florida State College
- South Florida State College
- State College of Florida
- St. Johns River State College
- St. Petersburg College



ADVISORY COMMITTEE BEST PRACTICES

Advisory Committees can answer the following questions:

- Are students prepared for the future job market?
- What should the training include?
- Is curriculum addressing industry needs?
- How can instructors verify competencies to industry standards?
- How can we recruit more students into ET programs?
- What are emerging trends in Engineering Technology?



ADVISORY COMMITTEE BEST PRACTICES

Advisory Committees offer many services including:

- Providing expert advice
- Assisting in public relations activities
- Offering different points of view
- Assisting in the placement of graduates
- Keeping educational programs up-to-date, recommending of equipment, and the development of simulated work environments
- Assisting student in transition to employment
- Offering training sites for work-based learning

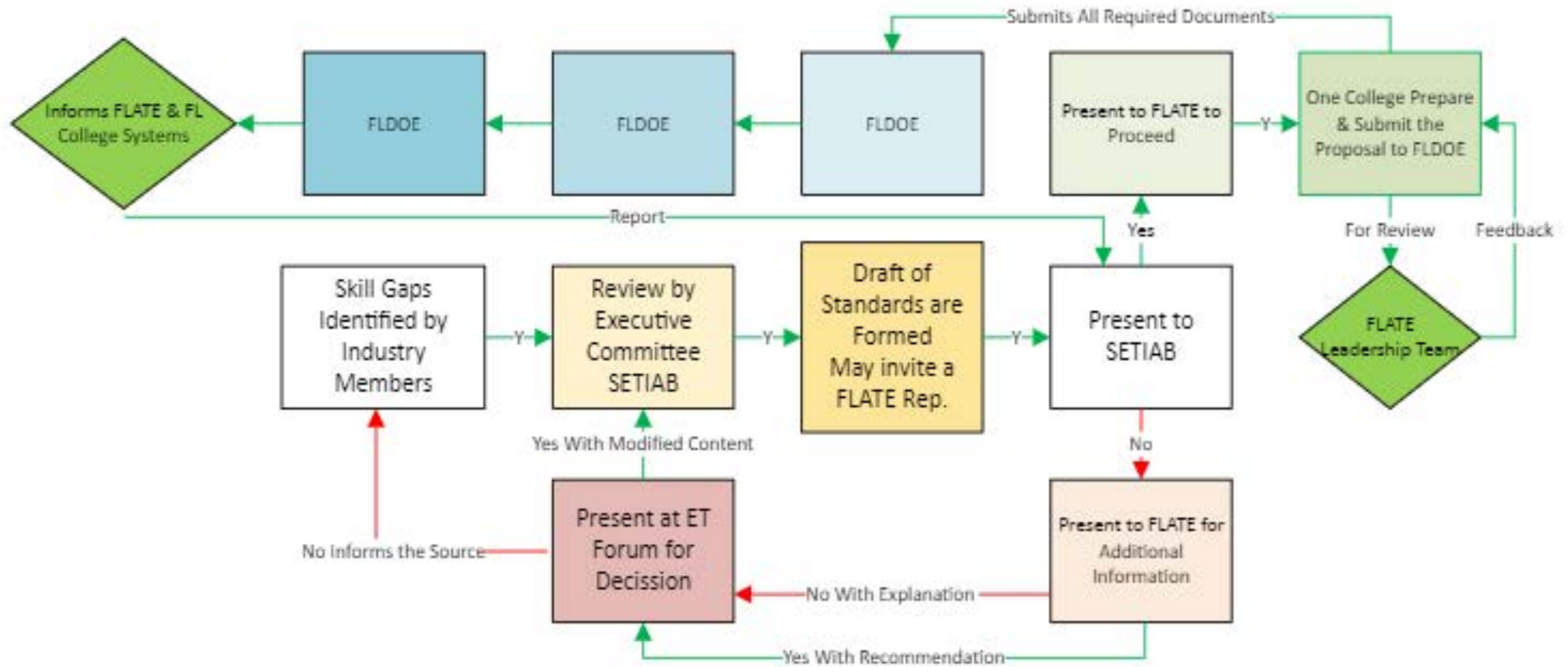


ADVISORY COMMITTEE BEST PRACTICES

- Industry must lead the curriculum (KSAs) discussions
- Focus on a single program
- Create a voting process with discussion to evaluate program KSAs
- Involve faculty
- Receive specific feedback from the college faculty regarding how they implemented the prioritized KSAs in the curriculum
- Communicate regularly between meetings (between educators and committee members).



ADVISORY COMMITTEE PROCESS



MORE INFORMATION

FLATE.SITE/SETIAB

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FLATE



CONNECTING MANUFACTURERS, EDUCATORS & STUDENTS WITH FLORIDA'S WORKFORCE

CONNECT WITH US ON SOCIAL MEDIA



@madeinflorida

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GOALS



Update Curriculum



Engaging Industry



Professional Development



Professional Development

- 1- A 2.5-day cybersecurity for manufacturing workshop in partnership with NCyTE.
- 2- A 4-part webinar series on cybersecurity in manufacturing
- 3- An intensive 36-hour Programmable Logic Controller (PLC) faculty training with two 2-day in-person and two 2-hour virtual sessions.
- 4- Two 1-day Mechatronics workshops for secondary educators where they built and wired a trainer they took to use with students.
- 5- A 1-day robotics expo with FANUC for industry and educators with presentations and demonstrations.
- 6- Semi annual presentations t Florida's ET Forum

UPCOMING in AUG 2024

Intermediate PLC (continuation of #3)

Dealing with Data and Cloud Computing (2-day in-person)



THANK YOU!!

Updating Florida's ET pathways for 14.0

New ASET Advanced Automation Specialization and BSIET

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