

Manufacturing, Instrumentation, Process Control



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2019

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Manufacturing, Instrumentation, Process Control Panel Members

Central College (NE) - Doug Pauley (dpauley@cccneb.edu)

Florida State College at Jacksonville (FL) – Alan Zube (alan.zube@fscj.edu)

South Arkansas Community College (AK) - Dave Caty (dcarty@southark.edu)

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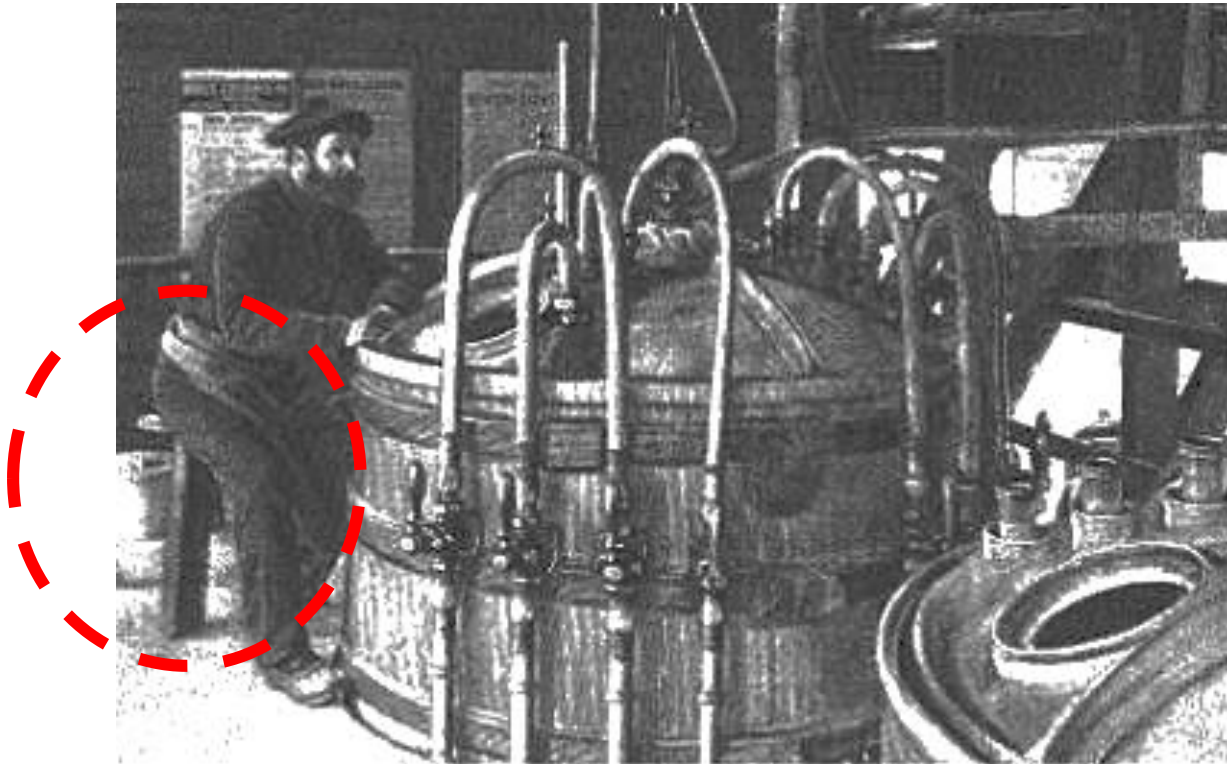
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Process Control



**1870 Ardeer Ayreshire
Alfred Nobel's Nitroglycerin Factory**

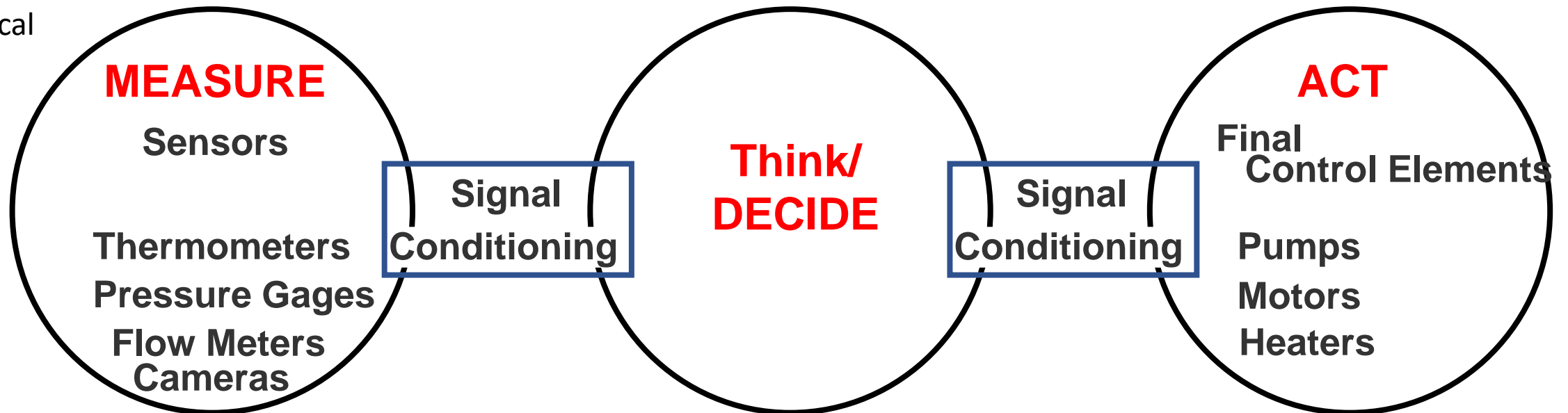
The Job: Prevent a runaway reaction.

One Legged stool: absolutely essential!!

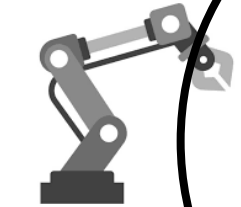
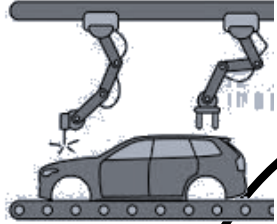
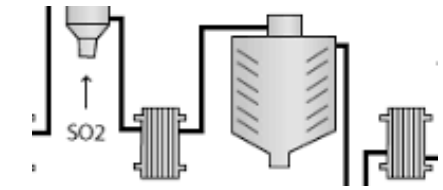
**This Nobel innovation prevented the
process operator from falling asleep on
the job.**

Process Control

Agriculture
Bio-pharma
Mico-nano
Adv Mfg
Energy
Chemical
Food



Process Control



MEASURE

Sensors

Thermometers
Pressure Gages
Flow Meters
Cameras

Signal
Conditioning

Think/
DECIDE

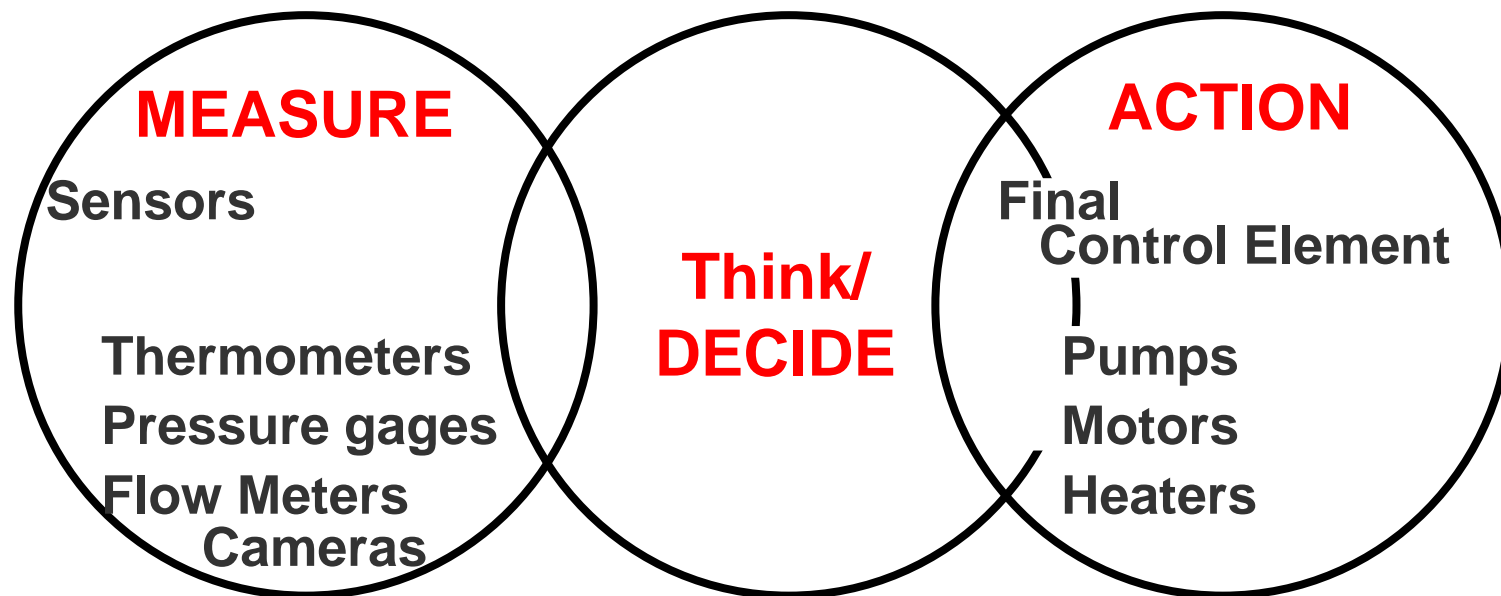
Signal
Conditioning

ACT

Final
Control Elements

Pumps
Motors
Heaters

Process Control



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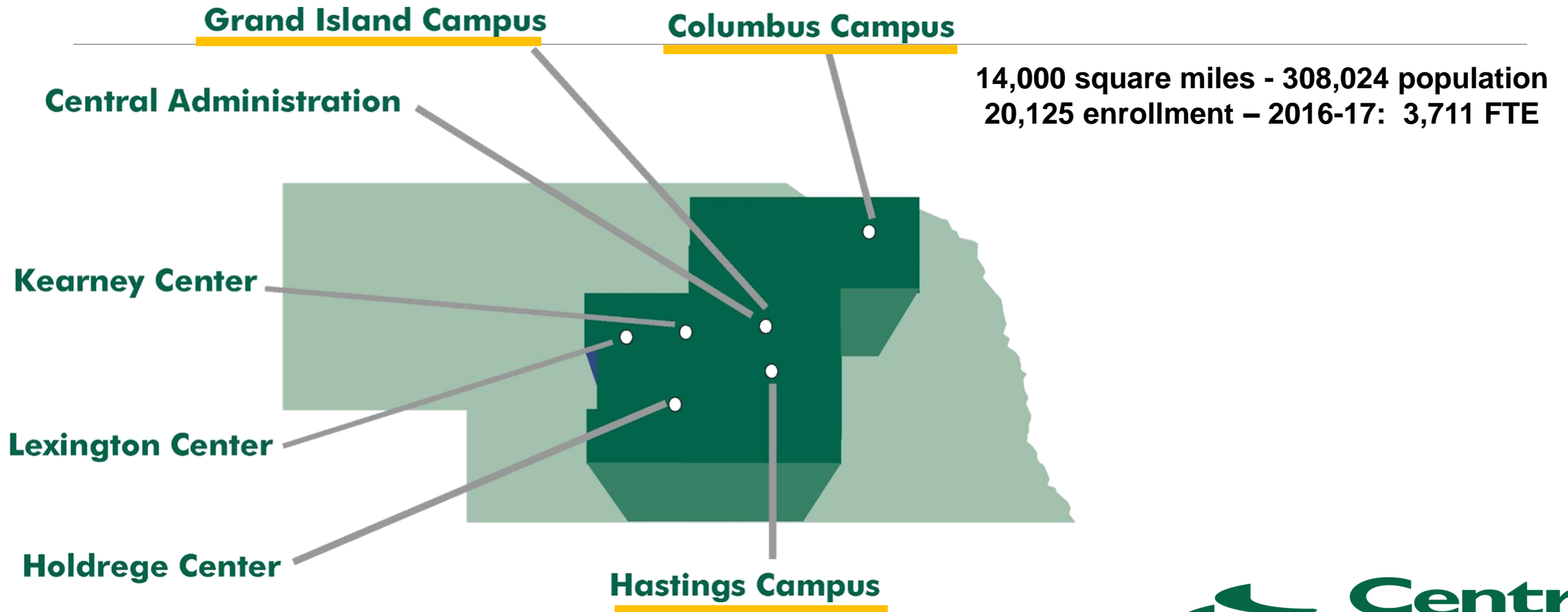


Columbus

Grand Island

Hastings

25 County Service Area



Mechatronics AAS Degree Required Subjects

- DC & AC Electrical Concepts
- Fluid Power Concepts
- Programmable Control Concepts
- Control Systems
- Mechanical System Concepts

-
- General Education Electives

Pathways

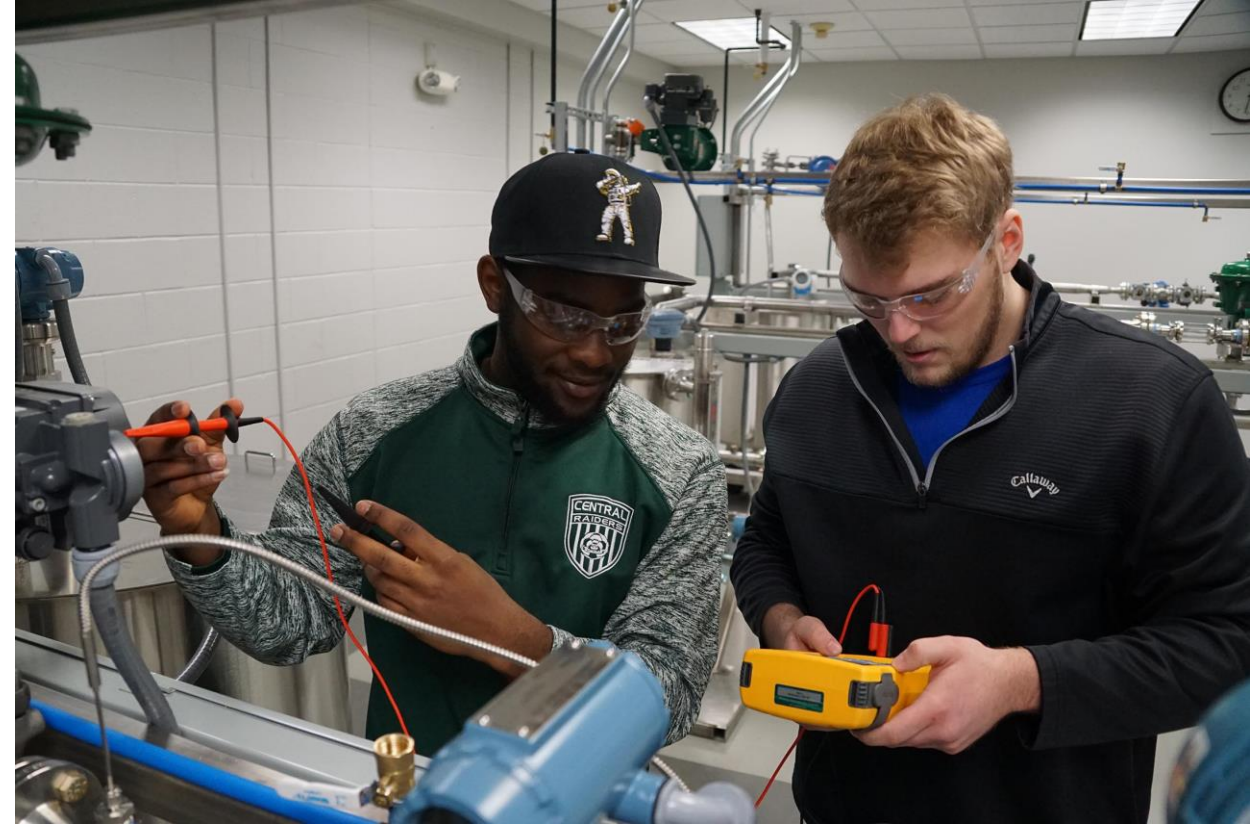


Electromechanical

- Adv. Programmable Controls
- AutoCAD Electrical
- Adv. Control Systems
- Industrial Sensors
- Prog. Automation Controls
- Capstone Processes

Instrumentation & Control

- Intro. to Instrumentation
- Process Measurement
- Control Valve Concepts
- Process Control Concepts
- Industrial Sensors
- Adv. Instrumentation

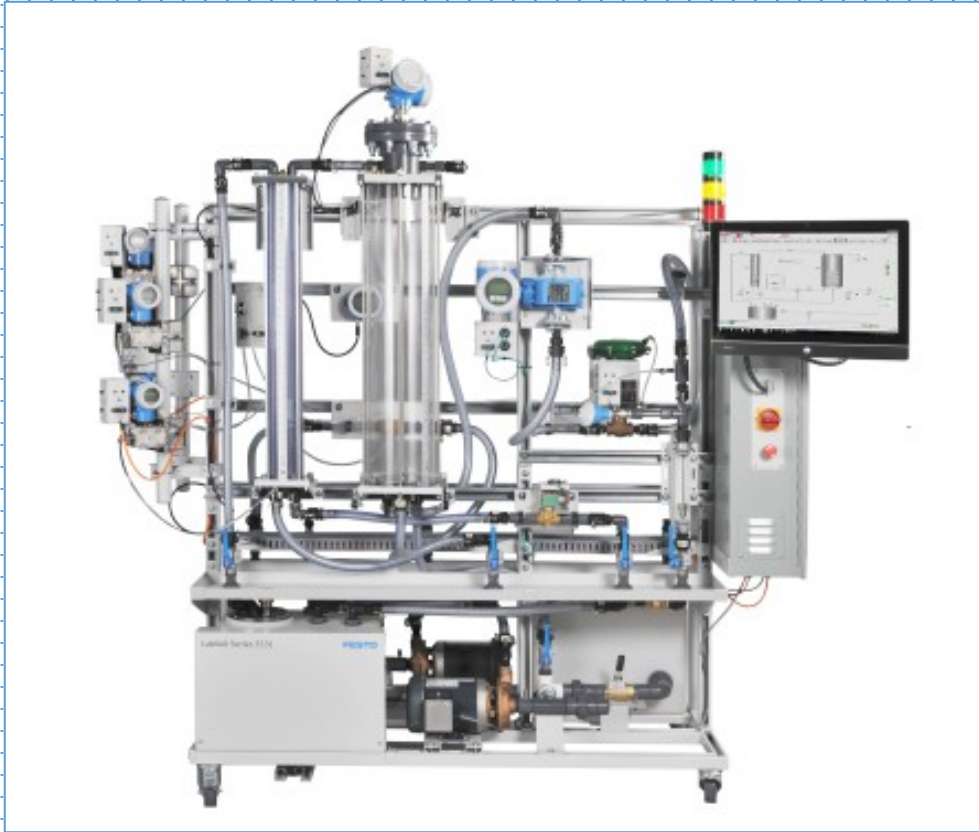




MwIC Business Partners



Instrumentation @ Florida State College Jacksonville



Partners:

NSF

Georgia Pacific

Siemens

Revlon

Kraft Foods

Jacksonville Energy Authority

Rayonier

On Syte

AWS

Maxwell House

Stellar

Current Advanced Manufacturing AAS Degree

1st Term

Course ID	Course Title	Credit Hours	Grade Earned
1* ENC 1101	English Composition I	3	
2* See Note Below	Choose 1 General Education Mathematics	3	
ETS 1352	Introduction to Manufacturing Processes	3	
EET 1084	Survey of Electronics	3	

Term Total = 12

3rd Term

Course ID	Course Title	Credit Hours	Grade Earned
2* See Note Below	Choose one General Education Humanities	3	
ETS 1603	Robotics-Mechanics and Controls	3	
ETI 2622	Introduction to Lean Manufacturing	3	
4* See Note Below	Choose 1 Professional Elective	3	

Term Total = 12

5th Term

Course ID	Course Title	Credit Hours	Grade Earned
*4 See Note Below	Choose 1 Professional Elective	3	
*4 See Note Below	Choose 1 Professional Elective	3	
CGS 2470	Computer Aided Drafting and Design	3	
BCN 2732	OSHA Safety	3	

Term Total = 12

2nd Term

Course ID	Course Title	Credit Hours	Grade Earned
3* See Note Below	Choose one General Education Communications	3	
ETS 1511	Motors and Controls	3	
ETS 1520	Basics of Instrumentation	3	
ETS 1700	Hydraulics and Pneumatics	3	

Term Total = 12

4th Term

Course ID	Course Title	Credit Hours	Grade Earned
2* See Note Below	Choose 1 General Education Social and Behavioral Science	3	
4* See Note Below	Choose 1 Professional Elective	3	
4* See Note Below	Choose 1 Professional Elective	3	
4* See Note Below	Choose 1 Professional Elective	3	

Term Total = 12

Total Credit Hours = 60

Proposed Advanced Manufacturing AAS Degree

1st Term

ENC 1101 – English Comp

Gen Ed. Math – #MGF 1106 or MAC 1105

ETS 1352 – Intro to Manuf. Process

EET 1084 – Survey of Electronics

3rd Term

Gen Ed Humanities - #PHI 2603

ETM 1010 – Metrology & Instrumentation

ETS 1542 – Intro to PLC

ETI 2622 – Intro to Lean Manufacturing

5th Term

BCN 2732 – OSHA Safety

ETS 1540 – Industrial Applications of Inst

ETS 2650 – Industrial Networking

Choose Professional Elective

2nd Term

Gen Ed Communications – #SPC 2065

ETS 1511 - Motors and Controls

ETS 1520 – Basics of Instrumentation

ETS 1700 - Hydraulics and Pneumatics

4th Term

Gen Ed Social/Behavioral Science – #INP 1390

ETM 2317 – Pumps and Drives

ETS 1531 - HMI and Systems Graphics

ETS 1603 – Robotics-Mechanics

30 Hour Certificate

ETS 1511 - Motors and Controls
ETS 1520 – Basics of Instrumentation
EET 1084 – Survey of Electronics
ETS 1700 - Hydraulics and Pneumatics
ETS 1542 – Intro to PLC
ETM 1010 – Metrology & Instrumentation
ETS 1531 - HMI and Systems Graphics
ETM 2317 – Pumps and Drives
ETS 1540 – Industrial Applications of Instrumentation
ETS 2650 – Industrial Networking





Hands On Technician Training



Embedding Technical Skills into Process Technology and Industrial Multi-craft

ATE Conference
Panel Discussion
10-24-19

Dave Carty, Project PI and Process Technology Program Director
Ray Winiecki, Co-PI and Dean of Career and Technical Education

southark.edu/hott

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.



Hands On Technician Training

HOTT



Petroleum



depositphotos.com

Fuel



flyclipart.com

Lubricants



clipartguide.com

Haz Waste
Incineration



keralaincinerator.com

Timber



canstockphoto.com

Paper



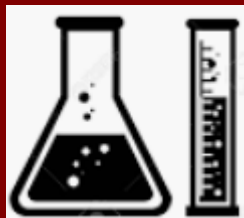
scienceabc.com

Electric
Power



123rf.com

Chemical



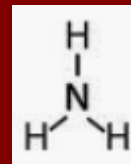
123rf.com

Bromine



bestmarketherald.com

Ammonia



gograph.com

Ammonium Nitrate



123rf.com



Hands On Technician Training



Issues

- Need for additional skilled workers
- Inconsistent skill-levels of graduates
- Varying student schedules



Hands On Technician Training



Solution

- Curriculum Redesign
- Instructional Delivery
- Student Access



Hands On Technician Training



Curriculum Redesign

- Hybrid model
- On-line course development
- Quality Matters best practices
- Learning object construction



Hands On Technician Training



Instructional Delivery

- Employability skill integration
- Competency-based learning outcomes
- Hands-on assessment



Hands On Technician Training



Student Access

- Interactive virtual simulations
- Student software 24/7
- Open lab schedule
- Hands-on equipment utilization



Hands On Technician Training

HOTT



CURRICULUM

- Intro to Industrial Technology
- Industrial Safety
- Instrumentation I

