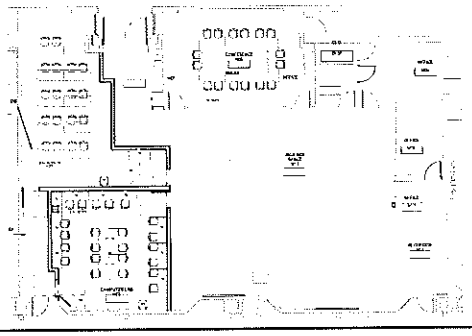
Industrial Technology Advisory/AMT Engineering/Maintenance Sub Committee Meeting

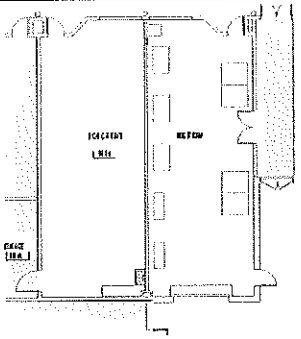
Friday, April 22, 2016
7:30 a.m.
McWherter Center for Advanced Industrial Technology

Meeting Agenda

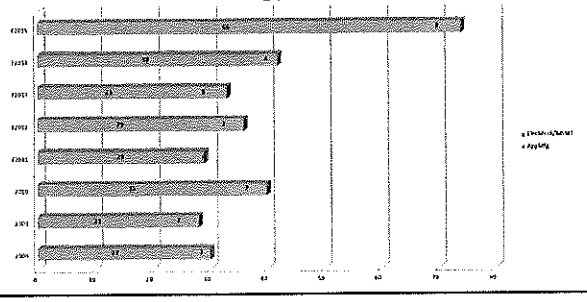
- See packet materials for details:
- Welcome – Reggie Davis, Committee Chairman, TBDN
- Old Committee Business – Jack Laser
- New Business – JSCC Staff/Faculty and Committee Input
  - Program Updates/Schedule/Recruitment
  - Curriculum Review
  - Statewide Update regarding IT and General Technology
  - JSCC faculty/staff training
  - Program funding efforts
- Facility Tour – JSCC Faculty

McWherter Center for Advanced Industrial Technologies

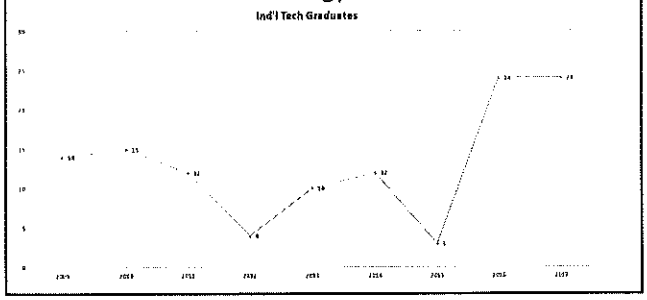




Industrial Technology Declared Student Trend



Industrial Technology Graduates Trend

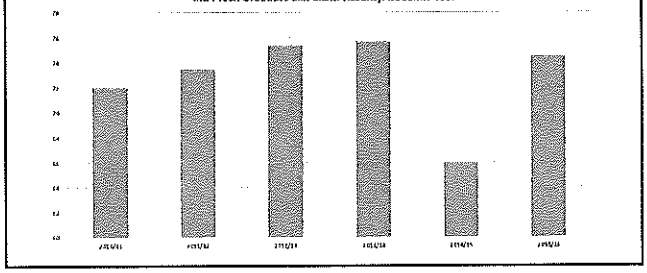


Key Facts of Ind'l Tech Class of 2016

(see info sheet for full details)

- 26 Industrial Technology AMT co-op students began in Fall 2014
- 20 co-op students will be graduating May 7, 2016
- That's a **77% completion rate in just two years of college**!!! (National average for community college completion is 39.1% in SIX years!)*
- Of the 20 co-op students graduating:
  - 2 going on to four year university
  - 16 expected employment opportunities with co-op partners
  - 2 available for employment
- Also, 4 additional IT students were able to complete all of their remaining degree requirements due to the additional 'push' received from the co-op students and JSCC staff/faculty
- *(National Student Clearinghouse Research Center, Shapiro & Dunbar, 2014)*

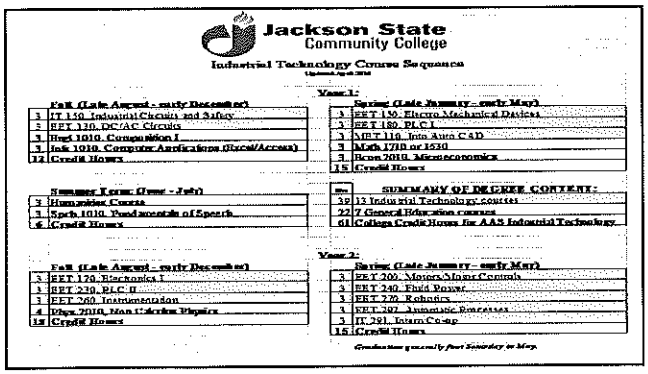
Comprehensive Exit Exam Results Trend



Applied Manufacturing Concentration – Deletion for NOW

- Program and Career Description
- This concentration prepares graduates for technical positions in industry and business in the areas between craftsman and the engineer. The primary objective is to provide a broad foundation of theoretical and practical knowledge in the areas of manufacturing processes, supervision, quality, and management opportunities. The curriculum is broad-based but focuses on the integration of each area as used in systemic applications.
- Estimated Salary Range

Career	Beginning Salary Range with AAS	Experienced Range
Industrial Technician	$27,530 to $32,890	$41,050+
Mechanical Drafter	$28,780 to $34,640	$43,920+



Jackson State Community College

Industrial Technology Course Sequence

Year 1:

Fall (Late August - early December)		Spring (Late January - early May)	
3	IT 150, Industrial Circuits and Safety	3	EET 150, Electro Mechanical Devices
3	EET 130, DC/AC Circuits	3	EET 180, PLC I
3	Engl 1010, Composition I	3	MET 110, Into Auto CAD
3	Info 1010, Computer Applications (Excel/Access)	3	Math 1710 or 1530
3	Econ 2010, Macroeconomics		
15	Credit Hours	15	Credit Hours

Summer Term: (June - July)	
3	Humanities Course
3	Spch 1010, Fundamentals of Speech
6	Credit Hours

	SUMMARY OF DEGREE CONTENT:
39	13 Industrial Technology courses
22	7 General Education courses
61	College Credit Hours for AAS Industrial Technology

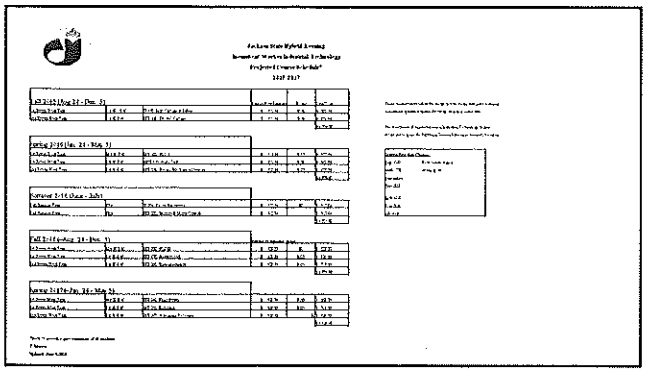
Year 2:

Fall (Late August - early December)		Spring (Late January - early May)	
3	EET 170, Electronics I	3	EET 200, Motors/Motor Controls
3	EET 230, PLC II	3	EET 240, Fluid Power
3	EET 260, Instrumentation	3	EET 270, Robotics
4	Phys 2010, Non-Calculus Physics	3	EET 207, Automatic Processes
15	Credit Hours	3	IT 291, Intern Co-op
		15	Credit Hours

Graduation generally first Saturday in May.

Industrial Technology Course Schedules

- **Daytime Morning and Afternoon Cohort Schedules**
- Consist of two day per week classes in all courses – other college divisions are highly supporting the alternate schedules required to allow the full degree requirements to be met by students coming to campus only two days/week over the five semester span
- Allows students to work the remaining three days/week
- **Incumbent Worker Evening Cohort**
- Designed to meet one night per week for mainly seven week, accelerated courses.
- Ability to complete technical course requirement of program within two years
- Many current workers just need to brush up on skillset and are taking the classes alongside the degree seeking students – in the same class.



Fall 2016 Course Schedule Options

- **EET 130, DC AC Circuits,** TR 10:50 – 12:05 and 1:00 – 2:15 p.m.
- **EET 170, Electronics I,** MW 9:25 – 10:40, 10:50 – 12:05 pm. and 1st seven week term – Tuesday 5:30 – 8:30 p.m.
- **EET 180,** PLC I – Weds, all term, 5:30 – 8:30 (per industry request)
- **EET 230,** PLC II, MW 8:00 – 9:15, 2:30 – 3:45 and all term Monday 5:30 – 8:30 p.m.
- **EET 260,** Instrumentation, MW 9:25 – 10:40, 10:50 -12:05 and Tuesday, 2nd seven week term, 5:30 – 8:30 p.m.
- **IT 150,** Ind'l Circuits/Safety, TR 9:25 – 10:40 (2 sections)
  - *DO YOU HAVE EMPLOYEES THAT COULD BENEFIT FROM TAKING THESE COURSES? WHAT OTHER COURSES MIGHT YOUR FIRMS NEED?*

We are looking for a few good men (and/or women)!

- In order to adequately staff the increased demand for IT courses, we are looking for additional adjunct, and full time, faculty to join the team.
- If you know of anyone in your facility that might be interested and meet the qualifications, please have them contact Jack Laser for more details.
- Instructors preferences:
  - Degreed engineer with at least five years of manufacturing experience (need this credential to meet ATMAE accreditation minimum instructor requirements without exceptions documentation required)
  - Or must have bachelors degree in related manufacturing field with at least ten years of relevant manufacturing experience
  - And ability to communicate effectively to a diverse population of students.

2016/17 Program Recruitment Efforts and Results – Cathi Roberts, Completion Coordinator

Jackson State Community College

Industrial Technology Course Sequence

Curriculum is reviewed regularly and is very exciting

Year 1:

Fall (Late August - early December)	
3	IT 150, Industrial Circuits and Safety
3	EET 130, DC/AC Circuits
3	Engl 1010, Composition I
3	Info 1010, Computer Applications (Excel/Access)
12	Credit Hours

Spring (Late January - early May)	
3	EET 150, Electro Mechanical Devices
3	EET 180, PLC I
3	NET 110, Into Auto CAD
3	Math 1710 or 1530
3	Econ 2010, Microeconomics
15	Credit Hours

Summer Term: (June - July)	
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6	Credit Hours

	SUMMARY OF DEGREE CONTENT:
19	Industrial Technology courses
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15	Credit Hours

Spring (Late January - early May)	
3	EET 200, Motors/Motor Controls
3	EET 240, Fluid Power
3	EET 270, Robotics
3	EET 297, Automatic Processes
3	IT 291, Intern Co-op
15	Credit Hours

IT 150, Industrial Circuits & Safety (reference validation sheet)

IT 150 – Industrial Circuits (First Semester Course)

This course will provide an overview of various industrial systems and applications used today. Topics include dc and ac theory, transformers, motors, PLCs, hydraulics, pneumatics, with emphasis on workplace safety and OSHA regulations.

OK	IT 150 Learning Objectives
	a. A study of safety in the workplace will be covered as it relates to industry with special focus on how accidents happen and how that affects productivity and competitiveness.
	b. OSHA regulations will be studied in detail as it relates to stress hazards, falling and lifting hazards, electrical and fire hazards. We will cover how companies and employees can prompt a safe work environment following the rules of safety.
	c. Students will be taught how to apply and use the safe practices of lockout and tag out procedures.
	d. To develop a general understanding of the different types of systems that are used in industry today and how these systems interact with one another.
	e. A study of different systems like electrical, hydraulic, pneumatics, motors, mechanical, PLC's, and other similar systems and sub-systems.
	f. A development of good troubleshooting skills as related to each system and sub-system.
	g. To provide a general understanding of schematic symbols and reading schematic diagrams.

Additional outcomes expected with curriculum updates starting Fall 2016:

_____Students will receive OSHA 10 Hour certification that is to be embedded within course.

_____Students will be exposed to more stringent course expectations including attendance, promptness and professionalism to set the tone for the balance of the industrial technology program requirements

EET 150 – Electromechanical Devices (see validation sheet)

EET 150 – Electromechanical Devices (Second Semester Course)
This course is a survey of the major topics used in the design and electrical and mechanical devices used in industrial settings. Electrical topics include motor, generator, transformers, PLC, DC power supplies, and circuit components. Mechanical topics include machine design (gears, belts, shafts, bearings, clutches, alignment, vibration insights etc) Solutions to design process problems using applied engineering mechanic and strength of materials are also addressed.

☒	EET 150 Learning Objectives
	a. To demonstrate the different types of mechanical systems used in industrial settings.
	b. To demonstrate a comprehensive knowledge of electromechanical devices used in industrial settings.
	c. To identify the different mechanical devices used in industrial equipment/industry.
	d. To apply the principles of physics to industrial and mechanical problems.

Additional outcomes expected with curriculum updates starting Fall 2016:
____Using supplemental mechanical trainer online simulations, students will be able to actively participate in virtual industrial activities deepening their application of the course principles.

EET 180, PLC I – see validation sheet

EET 180 – Programmable Logic Controls I (Second Semester Course)
An introduction to programmable logic controllers and their usage in modern industry is covered. Memory addressing schemes and ladder logic are discussed in detail. PLC installation and maintenance are also discussed.

☒	EET 180 Learning Objectives
	a. To impart an understanding and overview of programmable logic controllers.
	b. To familiarize the student with various PLC hardware components and system arrangements.
	c. To familiarize the student with PLC number systems and fundamentals of control logic.
	d. To provide an understanding in basic PLC wiring diagrams and ladder logic programs using industry standards.
	e. The proper use of timers and counters in a variety of PLC ladder logic program applications.
	f. Provide student with various programming examples, opportunities, and skill development.

Additional outcomes expected with curriculum updates starting Fall 2016:
____Course has updated hands on lab activities to aid with student's ability to apply concepts to real world situations.

EET 170 – Electronics I

EET 170 – Electronics I (Third Semester Course)
This course covers basic semiconductor theory. Theory and applications of diodes and transistors are discussed in detail. The operation o rectifiers, filters, and amplifiers is also covered. Circuit analysis and troubleshooting techniques are developed in the laboratory. Use of Multisim V12 shall be required for the course.

☒	EET 170 Learning Objectives
	a. Identify the solid state components.
	b. Describe the component level reactions in a solid state circuit.
	c. Apply component knowledge to construct a solid state circuit.
	d. Troubleshoot unexpected component reaction in a solid state circuit.
	e. Solve for expected results in a solid state circuit.

Additional outcomes expected with curriculum updates starting Fall 2016:
____Course will incorporate more digital electronics using Siemens techniques.

EET 200 – Motors and Motor Controls

EET 200 – Motors and Motor Controls
This course covers the principles of converting electrical power into mechanical work and mechanical power into electrical power. The basic electromagnetic principles of mothers, and motor controls are studies. Motor work, efficiency, torque, and speed shall be address in the lab.

☒	EET 200 Learning Objectives
	a. To impart an understanding of electrical motor theory.
	b. To discuss various means of starting, stopping and controlling motors.
	c. To provide hands-on experience in operating and analyzing motor control circuits.
	d. To develop techniques for troubleshooting motor control circuits.

Additional outcomes expected with curriculum updates starting Fall 2016:
____Course has updated hands on motion control trainers to aid with student's ability to apply concepts to real world situations.

EET 230 – PLC II

EET 230 – Programmable Logic Controls II (Third Semester Course)
A continuation of EET 180, PLC I. Advanced instruction set and hardware are discussed in depth. Analog I/O, encoders, PID controls, transducers, and internal file structures and usage are the main topics of interest.

☒	EET 230 Learning Objectives
	a. The study and usage of the advanced PLC instruction set.
	b. To develop techniques for handling analog inputs and outputs.
	c. To familiarize the student with PLC solutions to process problems in industry.
	d. To familiarize the students with the role of PLC's in networks.
	e. To provide hands-on experience in intermediate and advanced programming techniques.
	f.

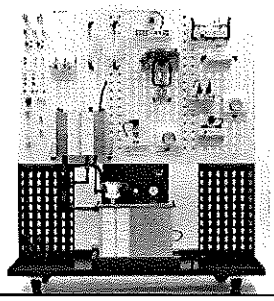
Additional outcomes expected with curriculum updates starting Fall 2016:
____Course has updated hands on lab activities to aid with student's ability to apply concepts to real world situations.

EET 260 - Instrumentation

EET 260 – Instrumentation (Third Semester Course)
Instrumentation is used to measure and control manufacturing processes and the physical properties of materials. This course covers the principles, applications, and understanding on how instrumentation accomplishes this task from an industrial perspective. We also cover how modern instrumentation measure, controls, and interacts with computer, electrical, hydraulic, and mechanical systems. Some focus is given to troubleshooting techniques used to troubleshoot instrumentation devices such as thermocouples, load cells, pressure transducers, and flow measuring devices.

☒	EET 260 Learning Objectives
	a. Define process instrumentation and identify present-day trends in the instrumentation field.
	b. Identify common industry standards and organizations that regulate these standards.
	c. Describe the control elements of a process control system and explain their function.
	d. Identify operation mechanical and electrical pressure instruments and their calibration.
	e. Define the different types of signal transmission and communication methodologies.
	f. Discuss automatic control and identify common terms associated with it.
	g. Describe the purpose of controller tuning, tuning coefficients, and performance parameters.

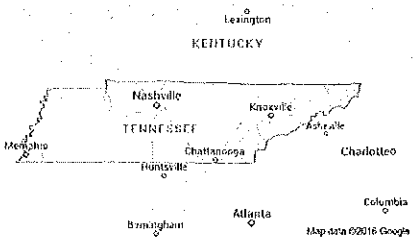
Additional outcomes expected with curriculum updates starting Fall 2016:
____See power point for more detail of additional training equipment and the attributes it would have to the course.



- **FEATURES**
- Totally self contained with all power supplies and fluid sources
- Industrial control devices and sensors PC programmable devices
- Modular and versatile
- Allows calibration and testing of process transmitters
- 4-20mA current loops
- Mobile wheeled trolley
- Fully developed curriculum
- PID controller

- **SUBJECT AREA:**
- Familiarization
- 4-20mA Current Loops
- 4-20mA Programmable Display
- Capacitive Level Sensor and Transmitter
- Temperature Sensors and Transmitter
- Flow Meter and Pulse Flow Sensor
- Introduction to Control Valves
- Pressure Devices
- Current to Pressure (I-P) Converter
- The Orifice Block
- Universal Transmitter
- Process Controller

Statewide Curriculum Changes



Faculty/Staff Specialized Trainings/Summer Externships –




Program Funding Efforts

TENNESSEE

LEAP

ROUND 2

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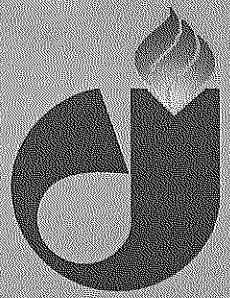
JSCC AMT Consortium



Metal Technologies

Jackson Die Casting

Pinnacle FOODS INC.

General Cable

lyondellbasell

CARLISLE

TOYOTA BODINE

PICTSWEET

DURO BAG MFG. CO.

DELTA FAUCET COMPANY

StanleyBlack&Decker

USF US FARATHANE CORPORATION

ARJ

Armstrong HARDWOOD FLOORING

GERDAU

TBDN TENNESSEE COMPANY