

From Industrial Maintenance to Mechatronics

You must have speakers to hear the narration on this presentation.
After each narration, click on each slide to advance.



How did we get here?

- In 2003, South Carolina changed from Industrial Maintenance to Industrial Systems Technology
- This change helped align South Carolina with the National title of Integrated Systems Technology and in an effort to spur enrollment
- Now, as a continuation, we are evolving to Mechatronics Integrated Technologies



The What and Why of Mechatronics?

This program prepares students for high tech careers in advanced manufacturing and high level Mechatronics maintenance positions.

Mechatronics refers to a flexible, multi-technological approach in the integration of Mechanical Engineering, Computer Engineering, Electronics, and Information Sciences.

Mechatronics is essential in the design of intelligent products. Within the next decades, the trade of intelligent products with improved flexibility, performance, reliability and maintainability will be crucial for the economic vitality of the United States.

These careers are high wage, challenging careers with national need for technicians accelerating rapidly.



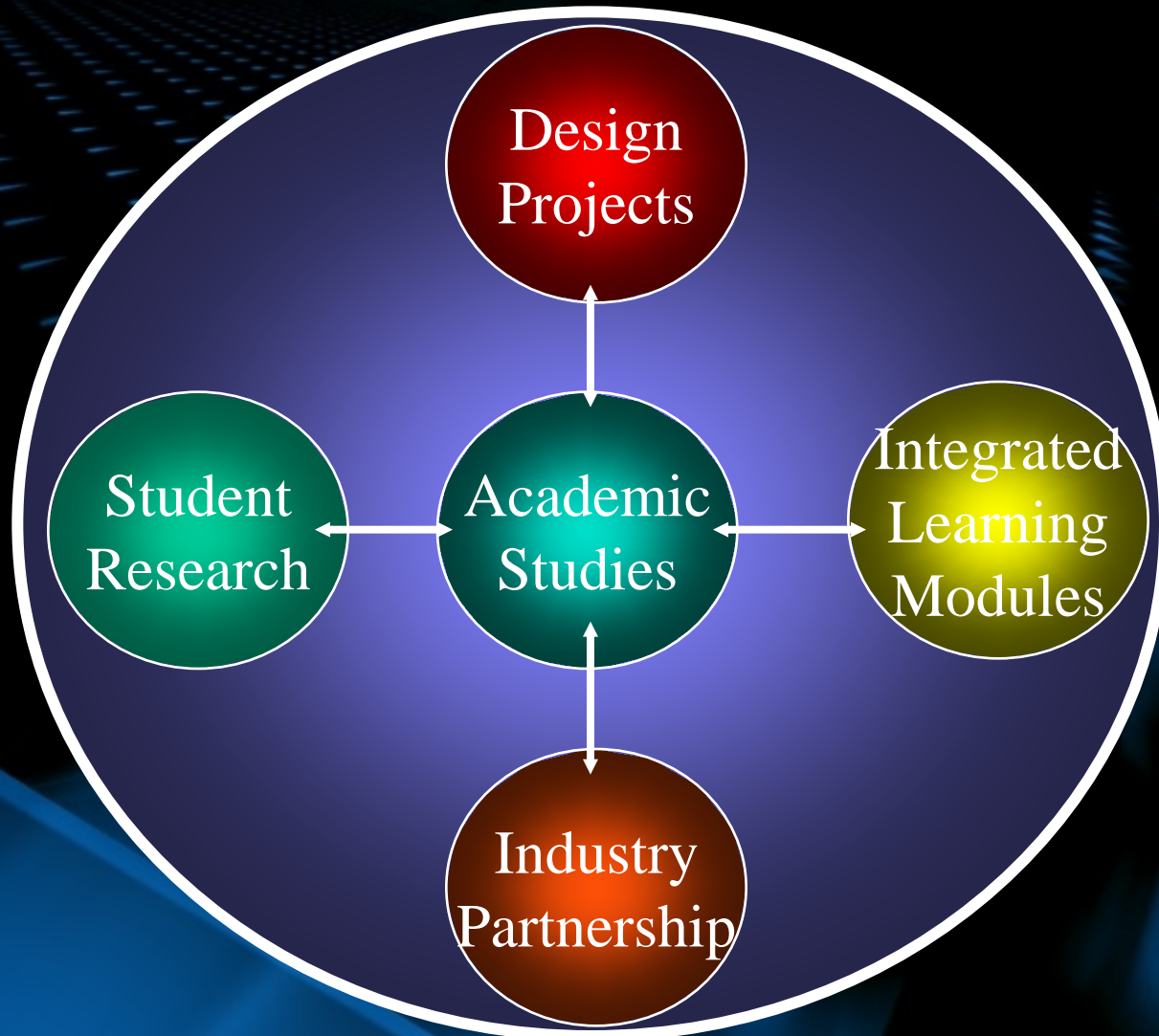


Mechatronics Integrated Technologies (MIT)

**“A world-class curriculum
for a global economy”**



Mechatronics Integrated Technologies Curriculum Model





MIT Curriculum Skill Development

- People Interaction
- Team Building
- Problem Solving
- Analytical
- Writing
- Oral Presentation
- Attitude
- Independent Learning
- Broad-based Technology
- In-depth Technology
- Organization Process
- Time Management



Benefits of Integrated Learning Modules

- Broad-based technical skills
- Skills articulate to 2-year college and workplace, meeting industry standards (i.e. National Center for Construction Education and Research (NCCER) www.nccer.org and Manufacturing Skills Standards Council www.msscusa.org (MSSC standards))
- Problem solving skills
- Develops math and science skills



MIT - A Skill-Based Curriculum

- Over 750 Skills Can Be Achieved

Partial List

Electrical Test Equipment Basic Safety Introduction to Blueprints Programmable Logic Controllers (PLC) Basic Electronic Theory Computer Networks and System Integration	Contactors and Relays AC DC Circuits Introduction to Electrical Blueprints Wiring: Commercial and Industrial Motor Theory Applications Motor Maintenance Motor Control Circuits
Basic Pneumatic Systems Basic Hydraulic Systems Troubleshooting and repairing of systems Air Logic Systems Gear Drives	Basic Machining Piping Systems Intro to Bearings Fiber Optics Robotics Automation





MIT Assessment Model

- Portfolio
- Quizzes/exams
- Design Project
- Research Projects
- Authentic Assessment/End of Program Assessment





MIT students are given Authentic Skill Assessments.

- What is an Authentic Skill Assessment?
 - Assessment of workplace relevant tasks
 - Actual demonstration of tasks



FESTO

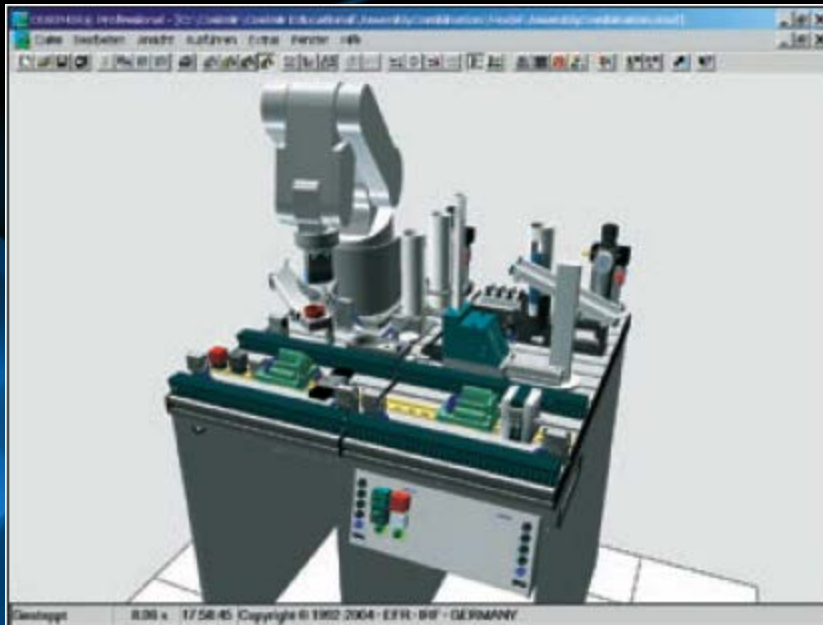
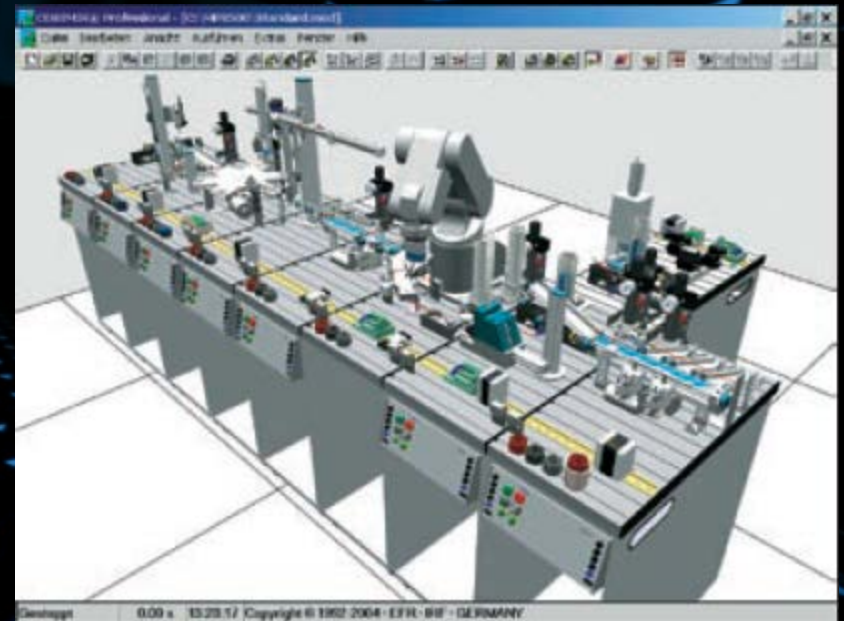




HYDRAULIC INSTRUMENTATION MODULE 85-BH

SEP 8 2005

Blythewood High School





SEP 8 2005

Blythewood High School







SEP 8 2005

Blythewood High School





MIT Means...Industry Can Expect:

- Students that have
 - Broad-based relevant technical skills
 - Good attitudes and workplace behaviors
 - Good interpersonal and teamwork skills
 - Better oral and written communication skills
 - Good math skills



Why does education need the MIT Program?

- **85%** of future manufacturing jobs will require an advanced degree – 2 year associates degree or 4 year degree
- **15%** will only require minimal or non-specific skills

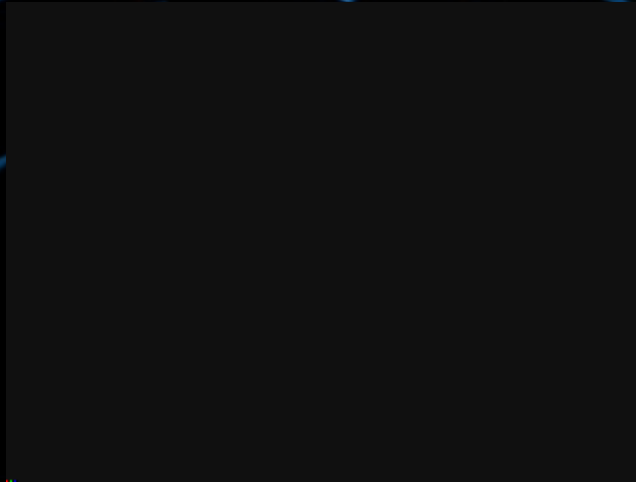
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- **40%** of 9th graders in 2002, dropped out of school before completing high school
- **60%** of those who complete high school will also complete an advanced degree

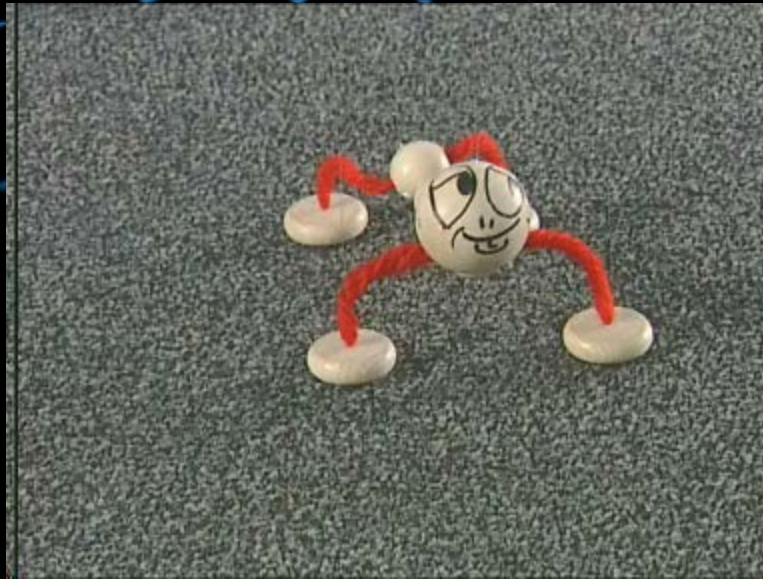


NATIONAL CENTER FOR INTEGRATED SYSTEMS TECHNOLOGY (NCIST)

<http://www.ncist.ilstu.edu/>



FESTO Integration of Robotic Technology



MIT addresses a National issue

- Twenty Years ago the US, Japan and China graduated a similar number of engineers – between 70,000 and 80,000 per year.

By 2000:

- China graduated 207,500 – a 161% increase
- Japan graduated 103,000 – a 42% increase
- Korea graduated 56,500 – a 140% increase
- The US graduated 59,500 – a 20% decrease !
- The United States is ranked 23rd relative to other nations !



Why does Industry need MIT Graduates?

- Relentless advances in technology have impacted every aspect of manufacturing - from design and production to inventory management, delivery and service.
- Today's manufacturing jobs are **technology jobs**, and employees at all levels must have the wide range of skills required to respond to the demands of an increasingly complex environment.



Some industry statistics

- Demographic shifts portend great change ahead. The “**baby boom generation**” of skilled workers will be retired within the next 15 to 20 years.
- The result is a projected need for **10 million new skilled workers by 2020.**



More Industrial Statistics

- Manufacturers confront persistent skills shortages in an Uncertain Economy. More than 80 percent of the surveyed manufacturers reported a **“moderate to serious” shortage of qualified job applicants** even though manufacturing was suffering serious layoffs.
- In sum, what manufacturing is facing is not a lack of employees, but **a shortfall of highly qualified employees with specific educational backgrounds and skills.**



MIT and Industry Ties

- **International Automakers**

(BMW, Honda, Daimler, Hyundai, KIA, etc.) will invest \$4 billion in the next 3 years + 9,000 employees. Today they are responsible for 93,000 jobs, as well as hundreds of thousands of employees of dealers, suppliers, etc.

- These MIT programs will allow students to be able to fulfill some these jobs out of high school or prepare them for further education.
- These programs can also incorporate products and systems that mirror those in industry. A perfect example is BMW. They utilize FESTO Pneumatics and Automation process. The MIT labs can incorporate systems from FESTO's Learning Systems. This will give students real-world, hands-on experience!



Mechatronics fills the bill...

- Manufacturing funds a major part of our growth including R&D
- Jobs on the manufacturing floor are changing from **blue collar to white collar**
- High skill levels are needed: by 2010
⇒ **80% of skilled workforce missing**
- Highly paid jobs / **careers in manufacturing**



Manufacturing Resources

Video Demonstrations

http://www.engr.colostate.edu/~dga/mechatronics/book/video_demos.html



Manufacturing Resources

National Center for Integrated Systems Technology

<http://www.ncist.ilstu.edu/>

Festo Corporation, Inc.

www.festo.com/uslearningsystems

Amatrol Corporation

<http://www.amatrol.com/index.htm>

Lab Volt

http://www.labvolt.com/display_left.cfm?ProductLineID=62&view=ProductLine



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