Digital Learning, Virtual Reality, and Recruitment

Fueling a New Vision for Technological Education
Introductions
Virtual Reality – An Overview
Exercises and Labs

Repeat the steps you learned in the guided practice to grind the top surface of the metal block.

This simulation is designed to introduce you to the CNC Lathe.

You hear a clanging noise emitting from the gears.
Immersive Environments
Modeling a Process

Before starting, make sure to check your high voltage 1000V gloves for holes.
Future Work
Oculus Rift

Outside Calipers

Outside Calipers
Reasons to Use VR in Education

- Aid in recruitment of technology-oriented students
- Increase capacity at educational institutions
- Provide authentic learning and access to high cost tools
- Educational design helps in development of basic and critical thinking skills
- Reduce costs
Integration into Curriculum
Integration as Part of the Whole

Outline
Open Text - Content
Mini-Video Lectures
Assessment Guide
Virtual Reality
Basic Electricity
- Fundamentals of Electricity: AC machines

Manufacturing
- Properties of Engineering Materials

Safety
- Personal Protection & First Aid

College Skills
- Planning for your Future Career*
Digital Learning Resources

- Video Lectures
- Virtual Reality Simulations
- Open Text
- Interactive Assessments
Tips for Successful Integration

1. Do not let technology drive the curriculum

2. No technology for technology sake

3. Consider the overall instructional framework
   - Learning design
   - Student centered
   - Learning theories

4. System wide involvement
Virtual Reality as a Recruitment Tool
Recruitment & Pathway Development

• Educational Pathway Development
  • Stackable Certificates

• K-12 STEM Initiatives
  • Recruitment campaigns (focus: underrepresented populations and rural areas)
  • Professional development

• Recruitment Resources
Virtual Reality for Electric Vehicle Safety
Center for Advanced Automotive Technology

Mission

• Advance the preparation of skilled technicians for the automotive industry’s more environmentally friendly and safer vehicles.

• Be a regional resource for developing and disseminating advanced automotive technology education.
Virtual Reality in Industry

- https://www.youtube.com/watch?v=eNQDu-kntfs
Project Rationale

• Electric/hybrid vehicles are high voltage (300V+)
• Safety basic to any BEV/HEV vehicle training
• Instructional material – vehicles available?
• Virtual reality alternative
Project Outcomes

• Four modules developed
  – Gloves
  – HV disconnect
  – Battery removal
  – HV component checks

• 84 hits in 8 months
Before starting, make sure to check your high voltage 1000V gloves for holes.
Roll up your gloves from the bottom up.
If the fingertips do not stay inflated, then your gloves have a hole.
Place the glove near your cheek and ear to feel and listen for leaks.
Always use protective leather gloves on top of rubber gloves.
Module complete: Checking the Gloves.
HV SERVICE DISCONNECT
A hybrid vehicle uses two or more distinct power sources to move the vehicle.
The term most commonly refers to hybrid electric vehicles (HEVs).
HEVs combine an internal combustion engine and one or more electric motors.
Hybrid vehicles can improve the fuel economy and reduce the emissions.
There are two principal battery packs
the High Voltage (HV) battery, also known as the traction battery.
And a 12 volt battery known as the Low Voltage (LV) battery.
Battery Form Factor: Prismatic
Battery Cell Modules: 168
Battery Nominal Voltage: 201.6 V
Battery Nominal Capacity: 6.5Ah
Battery Specific Power: 1310 W/kg
Battery Specific Energy: 44 Wh/kg
Battery per Module Dimensions: 7.71 x 4.17 x 11.22 inches
Tools Required: Wrench
Safety Gear Required: Safety Goggles.
Turn ignition off and verify the ‘Ready’ light is off.
(Click) to loosen the bolt on negative ground wire (Highlighted in green).
Remove the orange service plug on the right side of the Hybrid battery.
Pull the handle to the left.
Pull the orange service plug out. Wait 5 - 10 minutes before proceeding.
Module Complete: Disconnecting the Power.
PRIUS BATTERY PACK REMOVAL
(Click) to place orange service plug into the protective clip of the plate.
(Click) to rotate the orange service plug to unscrew the protective clip of the plate.
(Click) to lift the orange service plug and remove the protective clip.
(Click) to remove clamping bolts on the plate covering the HV Power lines.
(Click) to remove the plate covering the HV Power lines.
Keep safety glasses and gloves on.
Before beginning, test functionality of the multimeter with a live-dead-live check.
Check that the Volts(DC) is 12.6 at the 12V battery before proceeding.
Then check that the Volts(DC) is 0 at the HV battery before proceeding.
Again check that the Volts(DC) is 12.6 at the 12V battery before proceeding.
The Volts(DC) across traction battery terminal should be 0.
Unscrew the HV power lines.
Unclip, wrap and secure to the car body.
Locate and disconnect the ECU cables that attach the battery to the car.
Using a wrench, remove all battery holding bolts. (Two in front and two in back).
Module complete: Disconnecting the Power. Team lift (150lbs) to remove battery.
OTHER HV CHECKS
The service plug removal and high voltage disconnect must be complete.
Then wait 10 minutes before proceeding.
Locate and (Click) to select the inverter under the hood.
(Click bolt) to remove the bolts from the inverter cover.
(Click cover) to remove the inverter cover.
Check the DC Volts from the high voltage DC battery input terminals is 0.
Check that the Volts(DC) is 12.6 at the 12V battery before proceeding.
Then check that the Volts(DC) is 0 at the inverter battery before proceeding.
Again check that the Volts (DC) is 12.6 at the 12V battery before proceeding.
Module complete: Similar procedure used on HVAC, steering, motor, controller, etc.
Our mission is to ensure that Florida’s manufacturing technician education meets industry workforce needs.

How do we do this?

• Support program growth and development
• Implement innovative career/education pathways
• Sustain communities of practice

Impact locally. Lead nationally.
Statewide promotion of technical careers

Statewide unified A.S. Engineering Technology degrees, certificates and career pathways

Faculty Professional Development
The Florida Advanced Technological Education Center

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Exploring Advanced Manufacturing

The future of online education. EducateWorkforce is for anyone, anywhere, anytime.

Featured Courses

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Exploring Advanced Manufacturing

- Introduction and Overview
- Exploring Advanced Manufacturing
- Manufacturing Career Clusters
- A Hands-on Virtual Experience
- Next Steps
Exploring Advanced Manufacturing

Learner Outcomes

- Explain how modern advanced manufacturing differs from common perceptions of the industry
- Describe what is in a modern manufacturing facility
- Differentiate between manufacturing career pathways
- Describe the education & skills for successful careers
- Compare average manufacturing salaries to those in other industries

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Orienting Questions

• What are some misconceptions about manufacturing jobs?

• What are some different career options in manufacturing?

• What skills and education do I need to have a successful career in manufacturing?

• How do manufacturing salaries compare to other salaries?
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Featured Courses

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Featured Courses

- CUCWD MET101 INTRODUCTION TO METROLOGY
  Starts: Apr 01, 2014

- CUCWD MAIN109_TRIAL MANUFACTURING MAINTENANCE
  Starts: Aug 14, 2014

- CUCWD MFG108_TRIAL MANUFACTURING PROCESSES AND PRODUCTION

- CUCWD QUAL107_TRIAL QUALITY IN MANUFACTURING
  Starts: Aug 14, 2014

- CUCWD SFT106_TRIAL MANUFACTURING SAFETY

- CUCWD ELEC102 BASIC ELECTRICITY

- CUCWD WF111 WORKFORCE FUNDAMENTALS

- CUCWD EAM101 EXPLORING ADVANCED MANUFACTURING
Automotive
The automotive manufacturing sector creates and assembles all of the parts needed to make and use a vehicle. This includes the tires, frame, electronics, batteries and control systems for the vehicle.
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Manufacturing Sectors Activity

Please answer the following questions after you have watched the introduction video on Modern Manufacturing Sectors.

MODERN PRODUCTS (4/4 points)

Select the manufacturing sector in which each item is most likely produced:

- Automotive
- Aviation and Aerospace
- Metals and Plastic
- Transportation
Introduction

GOAL

The goal of this section is to present a few of the exciting career paths available in the modern manufacturing industry.
## Benefits of Careers in Modern Manufacturing

<table>
<thead>
<tr>
<th>Hi-Tech Environment</th>
<th>Collaboration</th>
<th>Challenge</th>
<th>Great Salary</th>
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<tbody>
<tr>
<td>Modern manufacturing facilities are clean, safe, and have the latest cutting-edge equipment.</td>
<td>Jobs in manufacturing allow you to work within a team to solve hands-on problems.</td>
<td>Manufacturing careers provide opportunities for innovation and high-tech exploration.</td>
<td>The average salary in manufacturing is typically $10,000 more than non-manufacturing jobs.</td>
</tr>
</tbody>
</table>
If you are interested in a career in manufacturing, the next step is to determine what kind of career you
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- Manufacturing Career Clusters
  - Introduction
  - Production
  - Maintenance, Installation and Repair
  - Quality Assurance
  - Logistics and Inventory Control
  - Process and Product Development
  - Health, Safety and Environmental Assurance
  - Module Summary

- A Hands-on Virtual Experience

- Next Steps

If you are interested in one of these careers, you can explore them further by:

- Checking the module summary
- Reviewing the process and product development
- Visiting the hands-on virtual experience
- Taking the next steps
Exploring Advanced Manufacturing

You have reached the eBook page.

Download the EPUB here

The eBook for this course is in the EPUB3 format and can be downloaded from the link above. This EPUB can be viewed on Windows and Macintosh.
The goal of this course is to expose students to the field of advanced manufacturing and the various career opportunities available to them in this industry. This course will enable students to explore the modern world of manufacturing. Additionally, students will learn about the different career pathways in manufacturing and the skills and education needed to attain these kinds of jobs.
Questions

• What type of software is required to run VR?
• What kind of costs are involved in developing the VR modules?
• What is student feedback on this approach?