WELCOME TO READING AREA COMMUNITY COLLEGE
Schmidt Training and Technology Center Course Listing

Ask us about WEDnet PA Grant Funding for your employee training!

Contact Chris Bashore @ 610.372.4721 Ext 5176

Please visit our Welcome Center in the Berks Hall lobby.
Discover a new career path!
Meet our friendly staff!
Learn about our credit and certificate programs!

Monday, Thursday, Friday: 8:00 AM - 5:00 PM
Tuesday, Wednesday: 8:00 AM - 7:30 PM
Call 610.607.6224 or visit racc.edu

Campus Map

1. Penn Street Bridge
2. Second Street
3. Franklin Street
4. Front Street
5. Faculty & Staff Parking
6. Student Lot B
7. 2nd St. Entrance to Lot B
8. Student Lot E
9. Faculty & Staff Parking
10. Berks Hall
11. Competition Tire
12. Kratz Hall
13. The Yocum Library
14. Weitz Hall
15. Gust Zogas Student Union Building
16. Schmidt Training & Technology Center
17. Miller Center for the Arts

It is the policy of Reading Area Community College to prohibit discrimination on the basis of race, color, sex, sexual orientation, religion, national or ethnic origin, age, disability, or status as a disabled or Vietnam Era veteran in regard to the administration of all campus programs, services and activities and the admission of students, employment actions, or other sponsored activities. Furthermore it is RACC’s policy not to tolerate harassment of any type, including sexual harassment, of or by any employee, student, contractor, vendor, and/or visitor to Reading Area Community College. In addition it is the policy of Reading Area Community College not to discriminate on the basis of sex in its educational programs and activities as required by Title IX of the Education Amendments of 1972. Title IX provides that “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.” Sex discrimination includes sexual harassment and sexual assault. Affirmative Action inquiries should be directed to the Affirmative Action Officer, RACC, P.O. Box 1706, Reading, PA 19603 (610.372.4723). All colleges and universities, in compliance with the Pennsylvania College and University Security and Information Act of 1988 and the Student Right-to-Know and Campus Security Act, are required to provide information regarding safety and security procedures and statistics on campus. A copy of this report is available by contacting Marketing and Communications, Room 323, Berks Hall.

WARRANTY DISCLAIMER. The College and its affiliates hereby disclaim all warranties, whether express, implied or statutory, including, without limitation, any implied warranty of merchantability or fitness for a particular purpose employability, future employment, licensure, certification or availability of courses, program, instructors or curriculum.

For more information on our graduation rates, the median debt of students who have completed programs and other important information, please visit our website at racc.edu/HEOA.
WELCOME TO THE SCHMIDT TRAINING & TECHNOLOGY CENTER

The Schmidt Training and Technology Center provides customized training programs that adjust to the changing needs of employers. Training programs based on employer needs use evolving instruction methods and technologies that are highly individualized.

INDUSTRY TRAINS HERE!

Tell us what you want – we will make it happen.
Don’t know you want – we can help with that too!

Hands-on training programs that deliver results. Tools to diagnose your need to maximize your investment. The Schmidt Training and Technology Center can meet your training needs in:

- CNC, Manual Machining, & CAD
- Robotics
- Fluid Power
- Mechanical Drive Systems
- Electrical Controls
- Information Technology Credentials
- Leadership, Workforce, Talent Development
## INFORMATION TECHNOLOGY

### A+ CISCO NETWORKING ACADEMY

<table>
<thead>
<tr>
<th>Job Prospects</th>
<th>Timeframe</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help Desk Support, Hardware Tech IT Tech, Desktop Support (foundational training for an IT career)</td>
<td>6 months</td>
<td>CompTIA A+ Certification IT Essentials, Fundamentals - ZCOM 336 IT Essentials, Advanced - ZCOM 337</td>
</tr>
<tr>
<td>Entry Level Network Tech Field Service Technician, NOC Technician (preparation for small sized network operations)</td>
<td>6 months</td>
<td>A+ Certificate, Intro to Networks ZCOM 413, Switching, Routing and Wireless Essentials - ZCOM 414</td>
</tr>
<tr>
<td>System Administrator, Network Engineer/Technicians, Help Desk Engineer, Sales Engineer (preparation for small to mid sized network operations)</td>
<td>8 months</td>
<td>CCNA 7.0 Intro to Networks ZCOM 413, Switching, Routing and Wireless Essentials - ZCOM 414, Enterprise Networking Security and Automation - ZCOM 416</td>
</tr>
</tbody>
</table>

### ENTRY LEVEL NETWORK TECH

<table>
<thead>
<tr>
<th>Job Prospects</th>
<th>Timeframe</th>
<th>Credential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry Level Network Tech</td>
<td>6 months</td>
<td>AMIST 1* Basic Skills Certificate</td>
</tr>
<tr>
<td>Operator / Entry Level Manual Machinist</td>
<td>6-12 months</td>
<td>Precision Machining Levels 1 &amp; 2</td>
</tr>
<tr>
<td>Entry Level CNC Programmer</td>
<td>18 months</td>
<td>CNC Precision Specialty Certificate</td>
</tr>
<tr>
<td>Machinist / CNC Programmer</td>
<td>24 months</td>
<td>Machine Tool Technology AAS</td>
</tr>
</tbody>
</table>

### MACHINE TOOL TECHNOLOGY

### INDUSTRIAL MAINTENANCE, MECHATRONIC, AAS

<table>
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<tr>
<th>Job Prospects</th>
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<th>Timeframe</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid Internship Entry Level Maintenance Tech</td>
<td>AMIST 1* Basic Skills Certificate</td>
<td>6 months</td>
<td>AMIST 1 • Industrial Mechanical • Industrial Electrical • Industrial PLC</td>
</tr>
<tr>
<td>Industrial Maintenance Tech</td>
<td>AMIST 2* Intermediate Skills Certificate (plus experience)</td>
<td>18 months</td>
<td>AMIST 1 plus • Industrial Mechanical 2 • Industrial Electrical 2 • Industrial PLC2</td>
</tr>
<tr>
<td>Industrial Maintenance Tech Level 2</td>
<td>AMIST 3* Advanced Skills Certificate (plus experience)</td>
<td>24 months</td>
<td>AMIST 1 &amp; 2 plus • Industrial Robots &amp; Motion Control • Advanced PLC • Process Control and Industrial Instrumentation</td>
</tr>
<tr>
<td>Industrial Engineering Tech &gt;&gt; AAS Degree Transfer credits to 4 year BS Program</td>
<td>Mechatronics, AAS with AMIST 4</td>
<td>&gt;24 months</td>
<td>ALL AMIST Certificates plus • Capstone Mechatronics Project • Manufacturing Fundamentals • General Education Requirements</td>
</tr>
</tbody>
</table>
CERTIFICATE AND DEGREE PROGRAMS
INFORMATION TECHNOLOGY, A+, CISCO NETWORKING ACADEMY®

CompTIA A+

Hands-on

A+ SERIES: IT ESSENTIALS
IT Essentials: PC Hardware and Software covers the fundamentals of PC computer technology, networking, and security, and also provides an introduction to advanced concepts. IT Essentials: PC Hardware and Software is a hands-on, e-learning solution with an emphasis on practical experience to help students develop fundamental computer skills along with essential career skills. This curriculum also helps students prepare for the CompTIA A+ certification.

Course Description
The IT Essentials courses are designed for students who want to pursue careers in IT and students who want to gain practical knowledge of how a computer works. Students who complete these courses will be able to describe the internal components of a computer, assemble a computer system, install an operating system, and troubleshoot using system tools and diagnostic software. Students will also be able to connect to the Internet and share resources in a networked environment. Additional topics covered include laptops and portable devices, wireless connectivity and basic implementation skills, Voice over Internet Protocol (VoIP), security, safety and environmental issues, applied network configuration and troubleshooting skills, and communication skills. Hands-on lab activities are essential elements that are integrated into the curriculum. Labs are designed to supplement learning and provide hands-on experience with physical equipment. Now including Mac IOS and Linux basics with added emphasis on mobile and wireless technologies.

Prerequisite: general knowledge of the use of a computer.

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.

IT Essentials - Fundamentals
ZCOM-336 $1,650
Textbook additional fee.
Includes test fee.
Approximate time to complete: 200 hours

IT Essentials - Advanced
ZCOM-337 $1,650
Includes test fee.
Prerequisite of ZCOM 336
(use book from ZCOM 336)
Approximate time to complete: 200 hours
CCNA Cisco Network Technologies

**CCNA 7.0**
Textbook additional fee.

CCNA 7.0 teaches comprehensive networking concepts and skills, from network applications to the protocols and services provided to these applications. Learners will progress from basic networking to more complex enterprise and theoretical networking models later in the curriculum. There are three courses that make up the CCNA 7.0 curriculum - they are aligned to cover the competencies outlined for the CCNA Certification Exam (200-301).

**INTRO TO NETWORKS**
ZCOM-413 $795 for Approx. 90 hours
Networking Today
- Basic Switch and Device Configuration
- Protocols and Models
- Physical Layer
- Number Systems
- Data Link Layer
- Ethernet Switching
- Network Layer
- Address Resolution
- Basic Router Configuration
- IPv 4 & 6 Addressing
- ICMP
- Transport and Application Layer
- Network Security Fundamentals
- Build a Small Network

**SWITCHING, ROUTING AND WIRELESS ESSENTIALS**
ZCOM-414 $795 for Approx. 90 hours
- Basic Device Configuration
- Switching Concepts
- VLANs
- Inter-VLAN Routing
- STP
- EtherChannel
- DHCPv4
- SLAAC and DHCPv6 Concepts
- FHRP Concepts
- LAN Security Concepts
- Switch Security Configuration
- WLAN Concepts & Configuration
- Routing Concepts
- IP Static Routing
- Troubleshoot Static and Default Routes

**ENTERPRISE NETWORKING, SECURITY, AND AUTOMATION**
ZCOM-416 $1095 for Approx. 90 hours (includes exam)
- Single-Area OSPFv2 Concepts and Configurations
- Network Security Concepts
- ACL Concepts
- ACLs for IPv4 Configuration
- NAT for IPv4
- WAN Concepts
- VPN and IPsec Concepts
- QoS Concepts
- Network Management
- Network Design, Troubleshooting, Virtualization and Automation

**IIOT**
ZCOM-419 $1,275 for Approx. 90 hours
The Cisco Network Associate Industrial (CCNA IIoT) certification is for plant administrators, control system engineers and traditional network engineers in the manufacturing, process control, and oil and gas industries, who will be involved with the convergence of IT and Industrial networks.

**Topics Include:**
- IP Networking
- Common Industrial Protocal (CIP) Knowledge and Configuration
- Profinet Knowledge and Configuration
- Security
- Wireless
- Troubleshooting

After completion of this course students can sit for the 200-601 IMINS2 Prerequisites: Industrial Networking Specialist or CCENT or CCNA Routing and Switching, or any valid CCIE certification

*Reasonable eligibility restrictions apply for the grade-based vouchers, we do not offer a pre-paid voucher for the CCNA composite exam.

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.

6 FALL COURSE CATALOG
### Precision Machining Level 1

**Basic CNC Operation**  
(Z)MTT-100  
$3,295  
150 hours

**Basic CNC Lathe Operation**  
(Z)MTT-101  
$585  
Teaches basic set up and operation of CNC lathes. Preparation NIMS Level I certificate: CNC Lathe Operation.  
Co-requisite: (Z)MTT-100  
30 hours

**Introduction to Machining**  
(Z)MTT-105  
$1,745 (textbook additional)  
Theoretical and practical aspects of shop safety, hand tools, precision layout, precision measuring instruments, taps, dies, files, reamers, and identification and use of appropriate materials to manufacture parts are covered. Preparation for two NIMS Level I certifications: Measurement, Materials and Safety; Layout and Bench work.  
75 hours

**Basic Machine Tools**  
(Z)MTT-110  
$1,745 (textbook additional)  
Basic operations of the drill press, pedestal grinder and band saw will be covered. Preparation for the NIMS Level I certification: Drill Press.  
75 hours

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### Precision Machining Level 2

**Turning Technology Level I**  
(Z)MTT-157  
$1,745 (textbook additional)  
Knowledge, practical learning experience and accident prevention awareness required to perform conventional lathe job planning, set-up and operation. Aspects of conventional, carbide and other tooling materials selection, preparation, and usage will be covered. Preparation to take NIMS Level I certification: Turning between Centers and Chucking.  
75 hours

**Milling Technology Level I**  
(Z)MTT-158  
$1,745 (textbook additional)  
Knowledge and skills necessary to identify and safely use various milling cutters and other tools that are adapted to milling machines. This course covers conventional milling machine parts and controls, the function of each part and control techniques so that students can operate the machines safely and with a high degree of accuracy. Preparation to take the NIMS Level I certification: Milling.  
75 hours

**Blueprint Reading**  
(Z)MTT-132  
$1,695 (textbook additional)  
Teaches necessary skills to interpret part drawings. Emphasis will be placed on stimulating the students’ creativity and the ability to visualize the drawn object. This course will start with simple part drawings and advance to more complex part drawings.  
75 hours

**CNC Programming**  
(Z)MTT-180  
$1,695 (textbook additional)  
Introduction to “G” and “M” code programming for Milling and Turning. Teaches theory designed to successfully start programming CNC Mills and Turning Centers. This program is recommended for the student who wants to further their knowledge in CNC Programming.  
75 hours

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These courses have an open start date.  
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
MILLING TECHNOLOGY LEVEL II
(Z)MTT-212 $1,745 (textbook additional)
Knowledge and skills necessary to identify and safely use various milling cutters and other tools that are adaptable to milling machines. Students learn to set up work pieces to be properly machined. Preparation for NIMS Level II certification: Milling.

STUDENTS & EMPLOYERS

ENGINEERING GRAPHICS WITH SOLIDWORKS
(Z)MTT-107 $1,195 (No Textbook Required)
Learn to use SOLIDWORKS to draw 3D part models, 2D part drawings, parametric parts, part assemblies and basic simulation. Exercises include sketching, extruding parts, editing parts, moving assemblies and SimulationXpress. Students will learn the foundational skills of SOLIDWORKS.

Precision Machining Level 3

Flexible start times available

These courses have an open start date. Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
CERTIFICATE AND DEGREE PROGRAMS
MACHINE TOOL TECHNOLOGY

FALL COURSE CATALOG 9

Precision Machining Level 4

CNC MILLING II
(Z)MTT-272 $1,845 (textbook additional)
Designed by FANUC to teach FANUC MACRO Programming. Preparation for NIMS CNC Milling Level II Programming and Operation exam. 75 hours

CAM PROGRAMMING
(Z)MTT-288 $1,695 (textbook additional)
Teaches skills of Computer Aided Manufacturing (CAM) programming using MasterCAM software. Students will learn how to create 2D mill, 3D mill and lathe part geometries and toolpaths. Students will also use the software to create CNC part programs and be able to verify their toolpaths. 75 hours

Plus General Education Requirements*

*Gen Ed Courses AAS Degree .................. 25 cr.
CSS 103 College Success Strategies ............ 3 cr.
MAT 165 Math Trigonometry .................... 3 cr.
IFT 110 Microcomputer Applications ............ 3 cr.
SOC 130 Sociology .................................. 3 cr.
COM 121 or 122 English Composition .......... 3 cr.
COM 141 Technical Writing ...................... 3 cr.
PHY 240 Physics I .................................. 4 cr.
Humanities Elective ................................ 3 cr.

Precision Machining Level 4 Electives - Select One

GRINDING TECHNOLOGY
(Z)MTT-221 $1,745 (textbook additional)
Teaches theoretical and the practical skills development in precision grinding operations. Students will learn to safely use a surface grinder, applying various techniques to make metal parts to blueprint specifications. Preparation for NIMS Level I & Level II certification in grinding. 75 hours

ADVANCED CNC TURNING
(Z)MTT-276 $1,845 (textbook additional)
Designed by FANUC to teach “G” and “M” code programming along with setup and operation of CNC Turning Centers. Preparation for NIMS CNC Turning Level 1 Programming and Operation exam. 75 hours

FIXTURE DESIGN - CAD EXPERIENCE PREFERRED
(Z)MTT-265 $1,245 (textbook additional)
Teaches CAD software design of production ready jigs and fixtures. Design features and methods will be discussed. 45 hours

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.

Flexible start times available
SPECIALTY CERTIFICATES

**CNC Precision**
- (Z)MTT 100 Basic CNC Operation
- (Z)MTT 101 Basic CNC Lathe
- (Z)MTT 180 CNC Programming
- (Z)MTT 185 CNC Milling Level 1
- (Z)MTT 276 Advanced CNC Turning
- (Z)MTT 272 CNC Milling Level 2
- (Z)MTT 288 CAM Programming

**Design/CAD**
- (Z)MTT 107 SOLIDWORKS
- (Z)MTT 132 Blueprint Reading
- (Z)MTT 288 CAM Programming
- (Z)MTT 310 Auto CAD
- ZMTT 330 Autodesk Fusion 360
- ZMTT 320 Autodesk Inventor
- ZMTT 341 Solidworks CAM
- ZMTT 350 Introduction to 3D Printing

**Manual Machining Level 1**
- (Z)MTT 105 Intro to Machining
- (Z)MTT 110 Basic Machine Tools
- (Z)MTT 157 Turning Technology Level 1
- (Z)MTT 158 Milling Technology Level 1

**Manual Machining Level 2**
- (Z)MTT 132 Blueprint Reading
- (Z)MTT 212 Milling Technology Level 2
- (Z)MTT 225 Turning Technology Level 2
- (Z)MTT 221 Grinding Technology

For description of all courses, reference pages 17-21
COMPUTER AIDED DESIGN (CAD)

**AUTOGRAPH - ZMTT 310**
Average time for course completion: 36 hours
Investment: $825
For the new user who needs comprehensive training in AutoCAD, edit and publish drawings with AutoCAD. No previous CAD experience necessary. Drafting, design or engineering experience a plus. **Prerequisite:** Working knowledge of the Windows-based operating system.

**ENGINEERING GRAPHICS WITH SOLIDWORKS**
ZMTT 107
Average time for course completion: 45 hours
Investment: $1,195
Learn to use Solidworks to draw 3D part models, 2D part drawings, parametric parts, part assemblies and basic simulation. Exercises include sketching, extruding parts, editing parts, moving assemblies and SimulationXpress. Students will learn the foundation skills of Solidworks.

**AUTODESK FUSION 360**
ZMTT 330
Average time for course completion: 45 hours
Investment: $1,195
Learn to use Autodesk Fusion 360 to create 3D part models, 2D part drawings and assemblies.

**AUTODESK INVENTOR**
ZMTT 320
Average time for course completion: 45 hours
Investment: $1,195
Learn to use Autodesk Inventor to create 3D part models, 2D part drawings and assemblies.

**SOLIDWORKS CAM**
ZMTT 341
Average time for course completion: 8 hours
Investment: $275
Learn how to use the included CAM function in Solidworks to create CNC milling toolpaths. You must be able to use Solidworks to complete this class.

**INTRODUCTION TO 3D PRINTING**
ZMTT 350
Average time for course completion: 8 hours
Investment: $295
Learn what 3D printing is and how a part gets printed.

Contact Judith Vecchio at 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
Schmidt Training and Technology Center

UPGRADE YOUR SKILLS - FOUR MODERN TECHNOLOGY LABS

STUDENTS & EMPLOYERS

Mechanical Lab

Drives, Hydraulics, Pneumatics, Pumps, Piping, Rigging, Troubleshooting

Schmidt Training and Technology Center Labs conveniently open Monday through Friday, accommodating both day and evening students.

Electrical Lab

AC/DC, Motors, Electronics, Sensors, Power Distribution, Troubleshooting
UPGRADE YOUR SKILLS - FOUR MODERN TECHNOLOGY LABS

PLC Networking Lab

Smart Automation, Mechatronics and Robotics Lab

Allen Bradley, Siemens, Communication, Troubleshooting

Programming, Process Control, Simulation, Communication, Troubleshooting

Schmidt Training and Technology Center Labs conveniently open Monday through Friday, accommodating both day and evening students.
Supporting the Training Needs of Pennsylvania’s Companies for More Than 20 Years! Formed in 1999 and funded by the Pennsylvania Department of Community and Economic Development, WEDnetPA is the primary delivery system for the Commonwealth’s incumbent worker training program. Each year, WEDnetPA serves more than 700 companies and tens-of-thousands of employees, strengthening these businesses and improving Pennsylvania’s economy.

Company Eligibility
- Must be located in Pennsylvania.
- Must be in an eligible industry cluster, commercial/industrial in nature and not limited or explicitly defined as ineligible in full guidelines.
- Maximum grant amount is $2,000 per employee, up to $100,000 per company per fiscal year.
- Company can only receive funding two years in a row or three out of a five year period.

Employee Eligibility
- Must be a resident of and employed in Pennsylvania.
- Must earn at least $12.00 per hour, excluding benefits.
- Must be permanently employed full-time and eligible for full-time benefits.
- Must be an employee of the specific company location for which a grant is awarded.

Eligible Training
- Must be skill building for current job or advancement.
- All of RACC’s Options include third-party providers, WEDnetPA partners and qualified in-house staff.
- Must start on or after July 1, 2021 and be completed on or before June 30, 2022. Partial training cannot be reimbursed.
- Cost must be “reasonable” as defined in complete guidelines.
- Each course must be a minimum of 30 minutes in length.

Contact our Certified WEDnet Partner, Chris Bashore, to discuss detailed company guidelines and to start the application process for funding. 610.372.4721 x5176 or cbashore@racc.edu
What is Industry 4.0 (I4) Automation?

This is the 4th Revolution of Manufacturing since the industrial revolution began. Industry 4.0 is rapidly employing Artificial Intelligence (computer systems able to perform tasks that normally require human intelligence) to do the “labor” and “technology” needed to design, produce and distribute commodities and services.

Why learn/train/educate in I4 Smart Automation?

As humans accelerate the demand for faster delivery of services and products, the ease and safety of doing work and tasks and the multitude and modality of choices, manufacturers and businesses are compelled to hire tech-savvy employees with “mental” muscle and problem solving abilities to set-up, operate and maintain all aspects of smart manufacturing. Careers and jobs are in high demand, wages are family sustaining and the work is more meaningful.
RACC’s Mechatronics/AMIST technical courses are offered in two instructional delivery/learning models:

- **Traditional** - All training, both theory and hands-on, conducted at the Schmidt Training and Technology Center.
- **Hybrid** - Theory accessed over the Internet with instructor support; hands-on skills taught and assessed at the Schmidt Training and Technology Center. Access to the Internet training site is 24 hours a day, seven days a week.

In both models, instructors with relevant industry experience are available to guide students through the program.

### AMIST 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Duration</th>
<th>Credits</th>
<th>Investment</th>
<th>Learning Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 120</td>
<td>Industrial Mechanical – Hydraulics Track</td>
<td>Approximately 162 hours</td>
<td>5 college credits</td>
<td>$4,485</td>
<td>Traditional or Hybrid</td>
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<tr>
<td>ZTEC 356</td>
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</table>

Traditional or Hybrid Learning
- Hydraulics 1
- Hydraulics 2
- Pneumatics 1
- Pneumatics Construction
- Piping Systems
- Hydraulic Troubleshooting
- Basic Mechanical Drives
- Light & Heavy Duty V-Belt and Chain Drives

### AMIST 2

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
<th>Investment</th>
<th>Learning Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 150</td>
<td>Industrial Mechanical 2 - Hydraulics Track</td>
<td>Approximately 170 hours</td>
<td>6 college credits</td>
<td>$4,415</td>
<td>Traditional or Hybrid</td>
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<td>ZTEC 369</td>
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</table>

- Spur Gear & Multiple Shaft Drives
- Belts, Lubrication, Shaft Alignment and Couplings
- Mechanical Drives 3 & 4
- Floor Standing Conveyors
- Vibration Analysis
- Laser Alignment
- Central Lubrication
- Pneumatic Directional Control Valves & Air Logic
- Advanced Pneumatics
- Pneumatic Troubleshooting

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<tr>
<td>ZTEC 371</td>
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Traditional or Hybrid Learning
- Pneumatics 1
- Pneumatics 2
- Pneumatics Maintenance
- Pneumatics Troubleshooting
- Hydraulics 1
- Piping Systems
- Basic Mechanical Drives
- Light & Heavy Duty V-Belt and Chain Drives

### AMIST 2

<table>
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<tr>
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<td>ZTEC 375</td>
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- Spur Gear & Multiple Shaft Drives
- Synchronous Belt Drives
- Lubrication Concepts
- Precision Shaft Alignment
- Couplings
- Mechanical Drives 3 & 4
- Floor Standing Conveyors
- Vibration Analysis
- Laser Alignment
- Central Lubrication
- Hydraulics 2
- Hydraulic Troubleshooting

**OR* - pneumatics concentration preferred by food and pharmaceuticals manufacturing, hydraulics concentration preferred by general manufacturing**

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
## Certificate and Degree Programs

### INDUSTRIAL MAINTENANCE TECHNICIAN, MECHATRONICS AAS

**AMIST 3**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Description</th>
<th>Credits</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 200</td>
<td>Industrial Robotics and Motion Control</td>
<td>ZTEC 531: Approximately 140 hours training, 4 college credits</td>
<td></td>
<td>$4,215</td>
</tr>
<tr>
<td></td>
<td>AB ControlLogix</td>
<td>• Robotics &amp; Computer Programming</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ZTEC 438: Approximately 170 hours training,</td>
<td>• Flexible Manufacturing Systems</td>
<td></td>
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<tr>
<td></td>
<td>4 college credits</td>
<td>• General Purpose Motion Control System</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Multi-Axis Motion Control System</td>
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</tr>
<tr>
<td>MET 210</td>
<td>Process Control &amp; Industrial Instrumentation</td>
<td>ZTEC 437: Approximately 90 hours training, 3 college credits</td>
<td></td>
<td>$2,555</td>
</tr>
</tbody>
</table>

**AMIST 4**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Description</th>
<th>Credits</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 111</td>
<td>Manufacturing Fundamentals</td>
<td>ZTEC 561: Approximately 30 hours training, 1 college credit - hybrid learning</td>
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<td>$565</td>
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<tr>
<td></td>
<td></td>
<td>• Principles of Advanced Manufacturing</td>
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<tr>
<td></td>
<td></td>
<td>Introduces typical plant processes such as Cnc, Plc and Automation</td>
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<td></td>
<td></td>
<td>Reviews typical plant layouts for efficient manufacturing</td>
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<td></td>
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<td>Manufacturing personnel and their responsibilities</td>
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<tr>
<td>MET 240</td>
<td>Capstone Class: Mechatronics Applications Project</td>
<td>ZTEC 558: Average time for course completion: 90 hours 3 college credits,</td>
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<td>$2,385</td>
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<td>Investment: $2,385</td>
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<td></td>
<td></td>
<td>• Quality Assurance</td>
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<td></td>
<td>- Basic Measurement, Precision Measurement, Dimensional Gauging</td>
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<td></td>
<td>- Introduction to SPC, SPC Problem Solving</td>
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<td>- Control Chart Operation, Control Chart Analysis</td>
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<td></td>
<td>- Geometric Dimensioning and Tolerancing</td>
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<td>- Location, Form and Orientation Tolerances</td>
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<td></td>
<td>• Blueprint Reading</td>
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<td></td>
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<td>• Solid Drawing Modeling</td>
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</tr>
</tbody>
</table>

**Advanced Industrial PLC - Your choice:**

- **Advanced Industrial PLC (AB ControlLogix):** ZTEC 438
  - Approximately 170 hours of training, 4 college credits
  - Investment: $3,200
  - Functions: PLC Controller and Troubleshooting
  - Analog I/O Application System
  - PanelView Plus 7
  - DeviceNet I/O Networking
  - ControlNet Networking
  - Ethernet/IP Networking

- **Advanced Industrial PLC Siemens S7-300 (ZTEC 439):**
  - Approximately 140 hours of training, 4 college credits
  - Investment: $3,995
  - Functions: Controller & Troubleshooting Functions
  - Analog I/O Application System
  - Profibus Communications System
  - TP1200 Operator Panel (HMI)
  - Remote Input/Output
  - Math and Data Move Instructions

**MET Courses Plus General Education Requirements**

- **Gen Ed Courses AAS Degree**: 31 cr.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSS 103</td>
<td>College Success Strategies</td>
<td>3 cr.</td>
</tr>
<tr>
<td>MAT 160</td>
<td>College Algebra</td>
<td>3 cr.</td>
</tr>
<tr>
<td>COM 121 or 122</td>
<td>English Composition</td>
<td>3 cr.</td>
</tr>
<tr>
<td>PHY 240</td>
<td>Physics I</td>
<td>4 cr.</td>
</tr>
<tr>
<td>IFT 110</td>
<td>Microcomputer Applications</td>
<td>3 cr.</td>
</tr>
<tr>
<td>SOC 130</td>
<td>Sociology</td>
<td>3 cr.</td>
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</table>

**Select one**: 4 cr.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 150</td>
<td>Biology I</td>
<td>3 cr.</td>
</tr>
<tr>
<td>CHEM 150</td>
<td>Chemistry I</td>
<td>3 cr.</td>
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<tr>
<td>PHY 245, Physics II</td>
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<td>3 cr.</td>
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<tr>
<td>COM 141</td>
<td>Technical Writing</td>
<td>3 cr.</td>
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<tr>
<td>HUM 100</td>
<td>Critical Thinking</td>
<td>3 cr.</td>
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</tbody>
</table>

**MET 101**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MET 101</td>
<td>Introduction To Shop Machinery</td>
<td>3 cr.</td>
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</tbody>
</table>

**Schmidt Training and Technology Center**
ASSOCIATE 1

INTRODUCTION TO MECHATRONICS
Associate 1 – Entry-Level Operations - ZTEC 901
Investment: $1695
Hours: 65

Topics include:
- Introduction to Industry 4.0
- Safety
- Hand Tools
- Measurement
- Print Reading
- Precision Measurement

ASSOCIATE 2

INTRODUCTION TO INDUSTRIAL CONTROL SYSTEMS
Associate 2 – Advanced Operations - ZTEC 902
Investment: $1695
Hours: 65

Topics include:
- Industry 4.0 Principles
- Mechanical Drives
- Hydraulics Fluid Power
- Pneumatics
- Robotics Programming
- Electrical Relay Control

ASSOCIATE 4

INTRODUCTION TO THE INDUSTRIAL INTERNET OF THINGS (IIOT)
Associate 4 – Entry-Level Data Analytics and Networking - ZTEC 904
Investment: $1695
Hours: 65

Topics include:
- Advanced Programmable Controllers
- Data Analytics 1
- Variable Frequency Drives
- Bar Code Production Identification
- Mechatronics: Motors and Conveyers
- Ethernet Network 2
- RFID Product Identification
- Smart Sensors
- Programmable Controllers
- System Optimization
- Mechatronics: Communication & ASRS
- PLC Troubleshooting
INDUSTRY 4.0 SMART AUTOMATION PROGRAMS AND COURSES

SMART AUTOMATION AND MECHATRONICS
SYSTEM - ZTEC 906
Average time for course completion: 170 Hours
Investment: $4,295
- Automation Operations
- Basic Component Adjustments
- Pick and Place Feeding
- Gauging
- Indexing
- Sorting and Queuing
- Servo Robotic Assembly
- Torquing
- Parts Storage
- Electro-Hydraulic Testing
- Multiple Station Control
- Mechatronics Troubleshooting
- Intro to Industry 4.0
- Smart Communications – Ethernet/ Wireless
- Smart Identification – Barcodes & RFID
- Smart Sensors – Pneumatic Vacuum/ Ultrasonic/ Photoeye/ Electrical Current/ Analog Position/ Analog Pressure
- Smart Device – Stack Light
- Smart Vision Inspection
- Cloud Based Manufacturing Execution – Maintenance, Communication and Network Security (SQUEAKS AP)

Pre-requisite Courses or Equivalent Experience Needed:
PLC Allen-Bradley Compactlogix L16 - ZTEC 454 (pg. 50)

SUPERVISORS AND MANAGEMENT

INTRODUCTION TO SMART AUTOMATION AND INDUSTRIAL INTERNET OF THINGS (IIOT) - ZTEC 905
Average time for course completion: 65 Hours
Investment: $1,695

Topics include:
- Automation Operations
- Cloud Based Data Acquisition
- Programmable Logic Controller Operation (Allen-Bradley Micro820)
- Basic PLC Programming
- PLC Motor Control
- PLC Timer and Counter Instructions
- Pick and Place Feeding
- Smart Sensors
- PLC Event Sequencing
- Database Concepts
- Indexing
- Sorting and Parts Storage
- Automated Storage and Retrieval Systems

CISCO INTRODUCTION TO NETWORKS
ZCOM 413*
Average time for course completion: 90 Hours
Investment: $795 Textbook Additional

SWITCHING, ROUTING, AND WIRELESS ESSENTIALS
ZCOM 414*
Average time for course completion: 90 Hours
Investment: $795 Textbook Additional

ENTERPRISE NETWORKING, SECURITY AND AUTOMATION
ZCOM 416*
Average time for course completion: 90 Hours
Investment: $1,095 (INCLUDES TEST VOUCHER)

* See page 14 for CISCO course descriptions.
INDUSTRY 4.0 SMART AUTOMATION
PROGRAMS AND COURSES

TECHNICIANS

MOTOMAN MERIT CERTIFIED
ROBOT FS100 BASIC PROGRAMMING WITH MATERIAL HANDLING
ZTEC 556
Average time for course completion: 32 Hours

This training is provided by RACC as a Motoman Merit Certified facility. The course is designed to help students learn to program and operate the FS100 Robot Controller using INFORM programming language (similar to the DX100).

- Safety
- Startup and Shutdown
- Pendant overview
- Jogging in all Coordinate Systems
- Copying, Creating, Deleting and Editing Jobs
- Alarm and Error Recovery,
- Programming and Monitoring Input/Output
- Using Math and Position Variables

FANUC INDUSTRIAL ROBOT PROGRAMMING & OPERATION WITH INTRO TO ROBOGUIDE/HANDLINGPRO AND ROBOT SIMULATION
ZTEC 903
Average time for course completion: 32 Hours

- Jogging The Robot
- Define Parts, Fixtures & End of Arm Tooling
- Teaching A Robot Program
- Matching Real Cell to Roboguide
- Electrical Relay Control
- Machines
- Importing and Exporting to and from the Robot
- Handling Tool Operations & Programming
- Overview, Robotic Safety & Components
- Robot Software & Teach Pendants
- Introduction to Coordinate Systems and Robot Jogging
- Error Recovery and Motion Groups
- Frames
- Robotic Program Development
- Data Registers, Looping, Payload Schedule
- Robotic Inputs and Outputs (I/O) and Macros
- Program Adjust and File Manipulation

INTRO TO MOTOMAN FS100 BASIC PROGRAMMING WITH MATERIAL HANDLING
ZTEC 559
Average time for course completion: 8 Hours
Investment: $375

Learn and understand the features of the FS100 Robot Controller and Programming Pendant using the INFORM programming language.

- Startup and Shutdown
- Tech Pendant Familiarization
- Pendant Screen
- Jogging and Coordinates
- Alarms and errors
- Selecting a Job
- Robot and Tool Path
- Non-Motion Instructions with Demonstration Program

INTRO TO FANUC® ROBOTS WITH HANDLING TOOL SOFTWARE
ZTEC 554
Average time for course completion: 8 Hours
Investment: $375

- Robot Safety
- Robot Systems
- Teach Pendant Overview
- Power Up and Jogging
- Frames and Programs Overview
- Instruction Overview
- Inputs/Outputs
- Hands-on Labs and Quizzes

*These courses have an open start date. Contact 610.372.4721 Ext. 5716 or Judith at jvecchio@racc.edu for pricing and details.
INTRO TO SMART SENSORS, DATA ACQUISITIONING & HMI
Average time for course completion: 8 hours
- Automation Operations
- Cloud-based Data Acquisition (SQUEAKS APP)
- SMART Sensors
- Into to HMI Panel Operation
- SMART Sensor Skill Application Project

INTRO TO ROBOTICS - Motoman Robot FS100 Basic Programming with Material Handling
- OR-
Fanuc Robot with Handling Tool Software
Average time for course completion: 8 hours
- Start-Up and Shutdown
- Tech Pendant Overview
- Jogging and Coordinates
- Alarm and Errors
- Selecting a Job
- Hands-On Skills

TYPES OF AUTOMATION AND HOW TO JUSTIFY AUTOMATING
Average time for course completion: 8 hours
- Parts Feeders, Vision, Robots, Semi Automated, Fully Automated, VR, AR, Conveyors
- Determining Real Cost and Projected Returns
- In-House vs. Out-Source
- Steps to Get Started
- Project

LEADING IN A CHANGING ENVIRONMENT
Average time for course completion: 8 hours
- Communicating Virtually
- Time Management in Real-Time World
- Metrics, Measuring, and Monitoring
- Collaboration with Accountability
- Employee Engagement and Retention Strategies
Your company’s customized training plan:

Who - each employee / student can receive their own plan.

When, Where – The STTC has very convenient hours of operation catering to all shifts.

What – you design the training programs to meet your needs.

ABC Manufacturing Inc - Customized Training Plan

LAP 1 Introduction to Electric Motor Control
LAP 2 Manual Motor Control and Overload Protection
LAP 3 Control Transformers Control
LAP 4 Ladder Logic
LAP 5 Control Relays and Motor Starters
LAP 6 Introduction to Troubleshooting
LAP 7 System Troubleshooting
LAP 8 Reversing Motor Control
LAP 9 Automatic Input Devices
LAP 10 Basic Timer Control: On-Delay and Off-Delay

This example employee training plan combines courses from different disciplines.

Pre-Assessment Service

Technical Theory and Skills

Save time and resources! Pre-assess your employee’s technical theory and skills prior to program / course selections.

Align Employees’ Acquired Theory and Skills Knowledge to our:

- Maintenance Tech / AMIST Programs
- Machining / CNC Programming
- Mechanical / Electrical / PLC

Contact Judith Vecchio at 610.372.4721 ext. 5716 or jvecchio@racc.edu

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.

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ELECTRIC MOTOR CONTROL - ZTEC 207

LAP 1 Introduction to Electric Motor Control
LAP 2 Manual Motor Control and Overload Protection
LAP 3 Control Transformers Control
LAP 4 Ladder Logic
LAP 5 Control Relays and Motor Starters
LAP 6 Introduction to Troubleshooting
LAP 7 System Troubleshooting
LAP 8 Reversing Motor Control
LAP 9 Automatic Input Devices
LAP 10 Basic Timer Control: On-Delay and Off-Delay

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POWER & CONTROL ELECTRONICS - ZTEC 252

LAP 1 Oscilloscopes
LAP 2 Linear Power Supplies
LAP 3 Power Supply Filtration and Regulation
LAP 4 Solid State Relays
LAP 5 Discrete Sensing Devices
LAP 6 Thermal Sensing Devices
LAP 7 Amplifiers and Operational Amplifiers
LAP 8 Analog Sensing Devices
LAP 9 Solid State Switching
LAP 10 Solid State Speed and Power Control

Save time and resources! Pre-assess your employee’s technical theory and skills prior to program / course selections.

Align Employees’ Acquired Theory and Skills Knowledge to our:

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Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
INDIVIDUAL COURSES
UPGRADE YOUR SKILLS - MANUFACTURING / TECHNICAL BASICS

Hand Tools, Safety, Quality

MECHANICAL FABRICATION
BASIC SKILLS - ZTEC 390
Average time for course completion: 32 hours
Investment: $615
LAP 1  Threaded Fasteners
LAP 2  Wrenches
LAP 3  Pneumatic System Fabrication
LAP 4  Screwdrivers
LAP 5  Pliers and Locking Devices
LAP 6  Mallets and Non-Threaded Fasteners
LAP 7  Torque Wrenches
LAP 8  Portable Power Tools

BLUEPRINT READING 1 - ZTEC 516
Average time for course completion: 12 hours
Investment: $275
LAP 1  Multiview Drawings
LAP 2  Sectional Drawings and Fasteners
LAP 3  Geometric Dimensioning and Tolerancing

MANUFACTURING PROCESSES - ZTEC 548
Average time for course completion: 36 hours
Investment: $1,035
Prerequisite: ability to read blueprints
LAP 1  Band Saw Operation
LAP 2  Intro to the Drill Press
LAP 3  Drill Press Operations
LAP 4  Intro to Manufacturing Hand Tools
LAP 5  Intro to the Manual Milling Machine
LAP 6  Milling Processes
LAP 7  Intro to the Manual Lathe
LAP 8  Turning Operations
LAP 9  Lathe Operations

QUALITY ASSURANCE - ZTEC 500
Average time for course completion: 44 hours
Investment: $1,199
Prerequisite: ability to read blueprints
LAP 1  Basic Measurement
LAP 2  Precision Measurement Tools
LAP 3  Dimensional Gauging
LAP 4  Introduction to Statistical Process Control (SPC)
LAP 5  Control Chart Operation
LAP 6  Control Chart Analysis
LAP 7  SPC Problem Solving
LAP 8  Geometric Dimensioning and Tolerancing
LAP 9  Location Tolerances
LAP 10 Orientation Tolerances
LAP 11 Form Tolerances

INTRODUCTION TO SHOP MACHINERY – ZTEC 558
Average time for course completion: 90 hours  3 college credits.
Investment: $2,385
• Quality Assurance
  - Basic Measurement, Precision Measurement, Dimensional Gauging
  - Introduction to SPC, SPC Problem Solving
  - Control Chart Operation, Control Chart Analysis
  - Geometric Dimensioning and Tolerancing
  - Location, Form and Orientation Tolerances
• Blueprints Reading
• Solid Drawing Modeling
  - Solid Model creation using Solidworks
  - Assembly creation using Solidworks
• Manual Machine Tools
  - Introduction to the Drill Press, Drill Press Operations
  - Introduction to the Milling Machine, Milling Operations
  - Introduction to the Manual Lathe, Lathe Operations
• OSHA 10-Hour General Industry Safety Course

MECHANICAL AND ELECTRICAL FABRICATION – MET 090/ZTEC 560
Average time for course completion: 45 hours
Investment: $815
LAP 1  Threaded Fasteners
LAP 2  Wrenches
LAP 3  Pneumatic System Fabrication
LAP 4  Screwdrivers
LAP 5  Pliers and Locking Devices
LAP 6  Mallets and Non-Threaded Fasteners
LAP 7  Torque Wrenches
LAP 8  Portable Power Tools
LAP 9  Electrical Systems
LAP 10 Residential Wiring System Components
LAP 11 Service Connections & Circuit Protection

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
INDIVIDUAL COURSES
UPGRADE YOUR SKILLS - MECHANICAL LAB

Hydraulics

BASIC HYDRAULICS - ZTEC 300
Average time for course completion: 20 hours
Investment: $529
LAP 1 Hydraulic Power Systems
LAP 2 Basic Hydraulic Circuits
LAP 3 Principles of Hydraulic Pressure and Flow
LAP 4 Hydraulic Speed Control
LAP 5 Pressure Control Circuits

INTERMEDIATE HYDRAULICS - ZTEC 301
Average time for course completion: 25 hours
Investment: $609
LAP 1 Hydraulic DCV Applications
LAP 2 Hydraulic Cylinder Applications
LAP 3 Hydraulic Relief Valve Operation
LAP 4 Hydraulic Check Valve Applications
LAP 5 Accumulator Applications

ADVANCED HYDRAULICS - ZTEC 302
Average time for course completion: 15 hours
Investment: $359
LAP 1 Hydraulic Motor Applications
LAP 2 Hydraulic Pump and Motor Performance
LAP 3 Fluids and Conditioning

HYDRAULIC TROUBLESHOOTING - ZTEC 308
Average time for course completion: 45 hours
Investment: $1,115
LAP 1 Introduction to Pressure-Compensated Pumps
LAP 2 Pressure-Compensated Pump Performance
LAP 3 Troubleshooting Hydraulic Pumps
LAP 4 Troubleshooting Hydraulic Actuators
LAP 5 Troubleshooting Hydraulic DCVs
LAP 6 Troubleshooting Flow Control and Check Valves
LAP 7 Troubleshooting Pressure Control Valves
LAP 8 Troubleshooting Unloader and Counter balance Valves
LAP 9 Troubleshooting Hydraulic Systems

Pneumatics

BASIC PNEUMATICS - ZTEC 305
Average time for course completion: 16 hours
Investment: $405
LAP 1 Pneumatic Power Systems
LAP 2 Basic Pneumatic Circuits
LAP 3 Principles of Pneumatic Pressure and Flow
LAP 4 Pneumatic Speed Control Circuits

INTERMEDIATE PNEUMATICS - ZTEC 306
Average time for course completion: 15 hours
Investment: $359
LAP 1 Pneumatic DCV Applications
LAP 2 Air Logic
LAP 3 Pneumatic Maintenance

ADVANCED PNEUMATICS - ZTEC 307
Average time for course completion: 15 hours
Investment: $359
LAP 1 Moving Loads Pneumatically
LAP 2 Vacuum Systems
LAP 3 Air Compressors

PNEUMATIC TROUBLESHOOTING - ZTEC 309
Average time for course completion: 35 hours
Investment: $869
LAP 1 Pneumatic Troubleshooting
LAP 2 Air Preparation Troubleshooting
LAP 3 Troubleshooting Pneumatic Cylinders
LAP 4 Motor & Rotary Actuator Troubleshooting
LAP 5 Troubleshooting DCV & Flow Control Valves
LAP 6 Troubleshooting Vacuum Systems
LAP 7 Troubleshooting Pneumatic Systems

PNEUMATIC SYSTEM CONSTRUCTION - ZTEC 324
Average time for course completion: 4 hours
Investment: $159

Lubrication

CENTRAL LUBRICATION - ZTEC 318
Average time for course completion: 20 hours
Investment: $495
LAP 1 Introduction to Central Lubrication
LAP 2 Lubrication Concepts
LAP 3 Simple Series/Progressive Lubrication System
LAP 4 Troubleshooting Series/Progressive Lubrication Systems
LAP 5 Piston Distributor Lubrication Systems

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
## MECHANICAL DRIVES 1 – ZTEC 311
Average time for course completion: 35 hours  
Investment: $895  
LAP 1: Intro to Mechanical Drive Systems  
LAP 2: Key Fasteners  
LAP 3: Power Transmission Systems  
LAP 4: Intro to V-Belt Drives  
LAP 5: Intro to Chain Drives  
LAP 6: Spur Gear Drives  
LAP 7: Multiple Shaft Drives

## MECHANICAL DRIVES 2 - ZTEC 312
Average time for course completion: 35 hours  
Investment: $895  
LAP 1: Heavy-Duty V-Belt Drives  
LAP 2: V-Belt Selection and Maintenance  
LAP 3: Synchronous Belt Drives  
LAP 4: Lubrication Concepts  
LAP 5: Precision Shaft Alignment  
LAP 6: Couplings  
LAP 7: Heavy-Duty Chain Drives

## MECHANICAL DRIVES 3 - ZTEC 313
Average time for course completion: 35 hours  
Investment: $895  
LAP 1: Plain Bearings  
LAP 2: Ball Bearings  
LAP 3: Roller Bearings  
LAP 4: Antifriction Bearing Selection and Maintenance  
LAP 5: Gaskets and Seals  
LAP 6: Advanced Gear Drives  
LAP 7: Gear Drive Selection and Maintenance

## MECHANICAL DRIVES 4 - ZTEC 314
Average time for course completion: 20 hours  
Investment: $515  
LAP 1: Brakes and Clutches  
LAP 2: Brake/Clutch Selection and Maintenance  
LAP 3: Linear Ball Bushings  
LAP 4: Ball Screw Drives

## FLOOR STANDING CONVEYORS - ZTEC 315
Average time for course completion: 4 hours  
Investment: $159

## VIBRATION ANALYSIS - ZTEC 316
Average time for course completion: 12 hours  
Investment: $349  
LAP 1: Intro to vibration analysis  
LAP 2: Vibration condition monitoring  
LAP 3: Vibration analysis

## LASER ALIGNMENT - ZTEC 317
Average time for course completion: 8 hours  
Investment: $239  
LAP 1: Intro to laser shaft alignment  
LAP 2: Laser shaft alignment operation

## CENTRIFUGAL PUMP SYSTEMS - ZTEC 319
Average time for course completion: 20 hours  
Investment: $525  
LAP 1: Centrifugal Pump Operation  
LAP 2: Centrifugal Pump Characteristics  
LAP 3: Centrifugal Pump Troubleshooting  
LAP 4: System Characteristics  
LAP 5: Centrifugal Pump Performance

## DIAPHRAGM PUMP - ZTEC 320
Average time for course completion: 4 hours  
Investment: $159

## PERISTALTIC PUMP - ZTEC 321
Average time for course completion: 4 hours  
Investment: $159

## MAGNETIC PUMP - ZTEC 322
Average time for course completion: 4 hours  
Investment: $159

## CENTRIFUGAL PUMP /STUFFING BOX - ZTEC 323
Average time for course completion: 4 hours  
Investment: $159

## MULTIPLE PUMP LEARNING SYSTEM - ZTEC 352
Average time for course completion: 4 hours  
Investment: $159

## GEAR PUMP - ZTEC 353
Average time for course completion: 4 hours  
Investment: $159

## PISTON PUMP - ZTEC 354
Average time for course completion: 4 hours  
Investment: $159

## TURBINE PUMP - ZTEC 372
Average time for course completion: 4 hours  
Investment: $159

## PIPING SYSTEMS - ZTEC 310
Average time for course completion: 35 hours  
Investment: $925  
LAP 1: Metal Piping Systems  
LAP 2: Metal Piping Installation  
LAP 3: Plastic Piping Systems  
LAP 4: Metal Tubing Systems  
LAP 5: Hoses  
LAP 6: Two-Way Valves  
LAP 7: Check Valves and Sloan Valves

These courses have an open start date.  
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
INDIVIDUAL COURSES
UPGRADE YOUR SKILLS - ELECTRICAL LAB

AC/DC ELECTRICAL SYSTEM – ZTEC 205
NEW TO ELECTRICAL? START HERE.
Average time for course completion: 30 hours
Investment: $750
LAP 1 Basic Electrical Circuits
LAP 2 Electrical Measurements
LAP 3 Circuit Analysis
LAP 4 Inductance and Capacitance
LAP 5 Combination Circuits
LAP 6 Transformers

ELECTRICAL RELAY CONTROL SYSTEMS – ZTEC 231
Average time for course completion: 15 hours
Investment: $359
LAP 1 Control Logic
LAP 2 Sequencing Control
LAP 3 Timers and Advanced Systems

ELECTRIC MOTOR CONTROL – ZTEC 207
Average time for course completion: 50 hours
Investment: $1,245
LAP 1 Introduction to Electric Motor Control
LAP 2 Manual Motor Control and Overload Protection
LAP 3 Control Transformers Control
LAP 4 Ladder Logic
LAP 5 Control Relays and Motor Starters
LAP 6 Introduction to Troubleshooting
LAP 7 System Troubleshooting
LAP 8 Reversing Motor Control
LAP 9 Automatic Input Devices
LAP 10 Basic Timer Control: On-Delay and Off-Delay

ADVANCED ELECTRIC MOTOR CONTROLS – ZTEC 208
Average time for course completion: 50 hours
Investment: $1,245
LAP 11 Motor Braking System
LAP 12 Reduced Voltage Starting Circuits
LAP 13 Power Generation and Distribution
LAP 14 Electronic Sensors
LAP 15 Timers and Counters
LAP 16 Variable Frequency AC Drive
LAP 17 Variable Frequency AC Drive, Speed & Torque Control
LAP 18 Variable Frequency Drives Acceleration, Deceleration, & Braking
LAP 19 Variable Frequency Drives Fault Diagnostics and troubleshooting
LAP 20 SCR Speed Motor Control

ELECTRICAL CONTROL SYSTEM WIRING – ZTEC 209
Average time for course completion: 10 hours
Investment: $295 (Allen Bradley or Siemens)
LAP 1 Introduction to Electrical Control Wiring
LAP 2 Electrical Control System Wiring

PNEUMATIC CONTROL CIRCUIT WIRING – ZTEC- 266
Average time for course completion: 5 hours
Investment: $159
PREREQUISITE ZTEC 209 ELECTRICAL CONTROL SYSTEM WIRING

PLC AND VFD ELECTRICAL CONTROL WIRING – ZTEC- 267
Average time for course completion: 5 hours
Investment: $159
PREREQUISITE ZTEC 209 ELECTRICAL CONTROL SYSTEM WIRING

CONTROL PANEL WIRING – ZTEC 260
Average time for course completion: 15 hours
Investment: $359 (includes Allen Bradley and Siemens)
LAP 1 Introduction to Electrical Control Wiring
LAP 2 Electrical Control System Wiring

ELECTRICAL FABRICATION – ZTEC 253
Average time for course completion: 12 hours
Investment: $245
LAP 1 Introduction to Electrical System
LAP 2 Residential Wiring System Components
LAP 3 Service Connections and Circuit Protection

BASIC ELECTRICAL ROTATING MACHINES – ZTEC 206
Average time for course completion: 32 hours
Investment: $825
LAP 1 DC Series Motors
LAP 2 DC Shunt and Compound Motors
LAP 3 Motor Speed and Torque
LAP 4 Motor Performance
LAP 5 Split-Phase AC Motors
LAP 6 Capacitor-Start AC Motors
LAP 7 Permanent-Capacitor and Two-Capacitor Motors
LAP 8 Three-Phase AC Induction Motors

ROTATING ELECTRICAL MACHINES DC GENERATORS – ZTEC 250
Average time for course completion: 8 hours
Investment: $239
LAP 9 DC Generators
LAP 10 Wound-Rotor Motors

ROTATING ELECTRICAL MACHINES – ALTERNATORS/SYNCHRONOUS MOTORS – ZTEC 251
Average time for course completion: 12 hours
Investment: $349
LAP 11 Alternators
LAP 12 Alternator Synchronization Methods
LAP 13 Synchronous Motors

ELECTRICAL POWER DISTRIBUTION – ZTEC 210
Average time for course completion: 25 hours
Investment: $635
LAP 1 Introduction to Raceways
LAP 2 Basic Conduit Bending
LAP 3 Advanced Raceways
LAP 4 Conductors, Disconnects and Overcurrent Protection
LAP 5 Conduit Sizing and Wire Pulling Techniques

ELECTRO-FLUID POWER SYSTEM – ZTEC 303
Average time for course completion: 40 hours
Investment: $959
LAP 1 Introduction to Electrical Control Systems
LAP 2 Basic Control Devices
LAP 3 Power Devices
LAP 4 Control Relays
LAP 5 Sequencing Control
LAP 6 Timer Control
LAP 7 Pressure Control Applications
LAP 8 Circuit Applications
### Electronics

#### POWER & CONTROL ELECTRONICS - ZTEC 252

- **Average time for course completion:** 50 hours
- **Investment:** $1,215
- **LAP 1** Oscilloscopes
- **LAP 2** Linear Power Supplies
- **LAP 3** Power Supply Filtration and Regulation
- **LPA 4** Solid State Relays
- **LAP 5** Discrete Sensing Devices
- **LAP 6** Thermal Sensing Devices
- **LAP 7** Amplifiers and Operational Amplifiers
- **LAP 8** Analog Sensing Devices
- **LAP 9** Solid State Switching
- **LAP 10** Solid State Speed and Power Control

#### AC ELECTRONIC DRIVES - ZTEC 400

- **Average time for course completion:** 35 hours
- **Investment:** $895
- **LAP 1** Introduction to AC Drives
- **LAP 2** Configuring A-B PowerFlex 70 Drives
- **LAP 3** A-B PowerFlex 70 Control Parameters
- **LAP 4** Communications and Diagnostics for A-B PowerFlex 70 Drives
- **LAP 5** Troubleshooting A-B PowerFlex 70 Drives
- **LAP 6** Configuring and Troubleshooting the A-B PowerFlex 40 Drive
- **LAP 7** Configuring and Troubleshooting Servo Drives

#### DC ELECTRONIC DRIVES - ZTEC 401

- **Average time for course completion:** 30 hours
- **Investment:** $755
- **LAP 1** Introduction to DC Motion Control
- **LAP 2** Basic DC Drives - SCR Control
- **LAP 3** DC Spindle Drives
- **LAP 4** DC Axis Drives
- **LAP 5** DC Pulse Width Modulation Drives
- **LAP 6** DC Drive Troubleshooting

#### ELECTRONIC SENSORS - ZTEC 304

- **Average time for course completion:** 8 hours
- **Investment:** $239
- **LAP 1** Introduction to Electronic Sensors
- **LAP 2** Electronic Sensor Applications

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
INDIVIDUAL COURSES
UPGRADE YOUR SKILLS - PLC LAB

STUDENTS & EMPLOYERS

AC/DC ELECTRICAL SYSTEMS ZTEC 205 AND ELECTRIC MOTOR CONTROL
ZTEC 207 ARE PREREQUISITE COURSES FOR PLC TRAINING.

Allen - Bradley

PLC ALLEN-BRADLEY SLC500 W/ TROUBLESHOOTING – ZTEC 402
Average time for course completion: 80 hours
Investment: $2,025
LAP 1 Introduction to Programmable Controllers
LAP 2 Basic PLC Programming
LAP 3 PLC Motor Control
LAP 4 Discrete I/O Interfacing
LAP 5 Introduction to PLC Troubleshooting
LAP 6 PLC Systems Troubleshooting
LAP 7 Event Sequencing
LAP 8 Application Development
LAP 9 PLC Timer Instructions
LAP 10 PLC Counter Instructions
LAP 11 Program Control Instructions
LAP 12 Math and Data Move Instructions

PLC ALLEN-BRADLEY SLC500 ANALOG APPLICATION SYSTEM – ZTEC 403
Average time for course completion: 15 hours
Investment: $379
LAP 13 Analog Input Modules
LAP 14 Analog Output Modules
LAP 15 Analog Scaling

PLC ALLEN-BRADLEY SLC500 DATA HIGHWAY 485 SYSTEM – ZTEC 404
Average time for course completion: 10 hours
Investment: $239
LAP 16 Introduction to DH-485
LAP 20 Remote I/O

PLC ALLEN-BRADLEY SLC500 PANELVIEW PLUS 1000 DH-485 SYSTEM
W/ KEY PAD – ZTEC 405
Average time for course completion: 15 hours
Investment: $379
LAP 17 Introduction to Panelview
LAP 18 Panelview Application Editing 1
LAP 19 Panelview Application Editing 2

PLC ALLEN-BRADLEY CONTROLLOGIX LEARNING SYSTEM WITH TROUBLESHOOTING – ZTEC 406
Average time for course completion: 80 hours
Investment: $2,025
LAP 1 Introduction to Programmable Controls
LAP 2 Basic PLC Programming
LAP 3 PLC Motor Control
LAP 4 Discrete I/O Interfacing
LAP 5 PLC Timer Instructions
LAP 6 PLC Counter Instructions
LAP 7 Introduction to PLC Troubleshooting
LAP 8 PLC Systems Troubleshooting
LAP 9 Event Sequencing
LAP 10 Application Development
LAP 11 Program Control Instructions
LAP 12 Math and Data Move Instructions

PLC ALLEN-BRADLEY CONTROLLOGIX ANALOG INPUT/OUTPUT – ZTEC 407
Average time for course completion: 20 hours
Investment: $525
LAP 13 Analog Input Modules
LAP 14 Analog Input Configuration and Troubleshooting
LAP 15 Analog Output Modules
LAP 16 Analog Output Configuration and Troubleshooting

PLC ALLEN-BRADLEY PANELVIEW PLUS 7 LEARNING SYSTEM – ZTEC 408
Average time for course completion: 15 hours
Investment: $379
LAP 1 Introduction to PanelView Plus 7
LAP 2 PanelView Plus Application Editing 1
LAP 3 PanelView Plus Application Editing 2

PLC ALLEN-BRADLEY CONTROLLOGIX ETHERNET – ZTEC 411
Average time for course completion: 25 hours
Investment: $525
LAP 1 Industrial Communications Networks
LAP 2 Remote Input/Output
LAP 3 Produced/Consumed Data and Messages
LAP 4 Troubleshooting EtherNet/IP

PLC ALLEN-BRADLEY DEVICE NET FOR CONTROLLOGIX – ZTEC 429
Average time for course completion: 15 hours
Investment: $379
LAP 1 Industrial Communication Networks
LAP 2 DeviceNet Input/Output
LAP 3 DeviceNet Troubleshooting

PLC ALLEN-BRADLEY CONTROLNET FOR CONTROLLOGIX – ZTEC 430
Average time for course completion: 15 hours
Investment: $379
LAP 1 Industrial Communications Networks
LAP 2 Remote Input/Output
LAP 3 Produced/Consumed Data and Messages

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
Allen - Bradley (cont.)

**PLC ALLEN-BRADLEY COMPACTLOGIX - L16**

**ZTEC 454**

Average time for course completion: 80 hours

Investment: $2,025

- LAP 1 Introduction to Programmable Controllers
- LAP 2 Basic PanelView Terminal Operation
- LAP 3 PLC Program Operations
- LAP 4 PLC Programming
- LAP 5 PLC Motor Control
- LAP 6 PLC Timer and Counter Instructions
- LAP 7 Event Sequencing
- LAP 8 Program Control Instructions
- LAP 9 Math and Data Move Instructions
- LAP 10 PanelView Plus Application Editing
- LAP 11 PanelView Plus Application Editing 2
- LAP 12 Analog Inputs
- LAP 13 Analog Outputs
- LAP 14 Variable Output Applications

**PLC TROUBLESHOOTING ALLEN BRADLEY COMPACTLOGIX - L16**

**ZTEC 455**

Average time for course completion: 20 hours

Investment: $525

- LAP 1 Introduction to PLC Troubleshooting
- LAP 2 PLC Systems Troubleshooting
- LAP 3 Analog Input/Output Troubleshooting
- LAP 4 Analog Application Troubleshooting

**INDIVIDUAL COURSES**

**UPGRADE YOUR SKILLS - PLC LAB**

These courses have an open start date.

Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.

racc.edu
SIEMENS

PLC SIEMENS S7-300 LEARNING SYSTEM WITH TROUBLESHOOTING - ZTEC 412
Average time for course completion: 80 hours
Investment: $2,025
LAP 1  Introduction to Programmable Controllers
LAP 2  Basic PLC Programming
LAP 3  PLC Motor Control
LAP 4  Discrete I/O Interfacing
LAP 5  PLC Timer Instructions
LAP 6  PLC Counter Instructions
LAP 7  Introduction to PLC Troubleshooting
LAP 8  PLC Systems Troubleshooting
LAP 9  Event Sequencing
LAP 10  Application Development
LAP 11  Program Control Instructions
LAP 12  Math and Data Move Instructions

PLC ANALOG LEARNING SYSTEM
SIEMENS S7-300 - ZTEC 413
Average time for course completion: 25 hours
Investment: $525
LAP 13  Analog Input Modules
LAP 14  Analog Input Applications and Troubleshooting
LAP 15  Analog Output Modules
LAP 16  Analog Output Applications and Troubleshooting

PLC PROFIBUS SYSTEM SIEMENS S7 - ZTEC 414
Average time for course completion: 15 hours
Investment: $365
LAP 1  Industrial Comm Network (Siemens S7-300 Profibus)
LAP 2  Data Exchange

PLC SIEMENS TP1200 OPERATOR PANEL LEARNING SYSTEM - ZTEC 415
Average time for course completion: 15 hours
Investment: $379
LAP 1  Introduction to Siemens HMI Panel
LAP 2  Application Editing 1
LAP 3  Application Editing 2

PLC SIEMENS S7-300 REMOTE I/O - ZTEC 444
Average time for course completion: 5 hours
Investment: $159
LAP 1 - Remote Input/Output

PROCESS CONTROL SYSTEM - ZTEC 416
Average time for course completion: 60 hours
Investment: $1,425
LAP 1  Introduction to Process Control
LAP 2  Instrument Tags
LAP 3  Piping and Instrumentation Diagrams
LAP 4  Loop Controllers
LAP 5  Final Control Elements
LAP 6  Level Measurement
LAP 7  Liquid Level Control
LAP 8  Methods of Automatic Control
LAP 9  Basic Flow Measurement and Control
LAP 10  Control Loop Performance
LAP 11  Ultrasonic Level Measurement and Control
LAP 12  Differential Pressure Flow Measurement and Control

THERMAL PROCESS CONTROL - ZTEC 417
Average time for course completion: 60 hours
Investment: $1,425
LAP 1  Introduction to Process
LAP 2  Control Instrument Tags
LAP 3  Piping and Instrumentation Diagrams
LAP 4  Thermal Energy
LAP 5  Basic Temperature Control Elements
LAP 6  Loop Controllers
LAP 7  Final Control Elements
LAP 8  Temperature Sensors and Transmitters
LAP 9  Temperature Transmitters
LAP 10  Basic Temperature Control
LAP 11  Methods of Automatic Control
LAP 12  Control Loop Performance

Contact Judith Vecchio at 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
Automation has crossed into all plateaus of modern manufacturing. From raw materials to the finished product, manual labor has been replaced with robots, automatic equipment and computer networks, all in effort to produce items that are more accurately made and less costly to manufacture. The workforce needed to service these industries now and in the future will require additional skills.

The Flexible Manufacturing System builds on basic robot operation and programming and adds linear motion, serial communications and multitasking applications.

**FLEXIBLE MANUFACTURING SYSTEMS – ZTEC 510**

Average time for course completion: 50 hours  
Investment: $1,375  
**PREREQUISITE ZTEC 543 - ROBOTICS AND COMPUTER PROGRAMMING**

- LAP 1 Intro to Flexible Manufacturing Systems
- LAP 2 Point-to-Point Assembly
- LAP 3 Linear Motion Assembly
- LAP 4 Palletizing
- LAP 5 Robot FMS Workcell
- LAP 6 Robot Communications
- LAP 7 Serial Device Applications
- LAP 8 Multitasking

**MOTION CONTROL (SERVO) LEARNING SYSTEM – ZTEC 520**

Average time for course completion: 36 hours  
Investment: $1,155  
Teaches the fundamentals of current industrial servo drive systems. Servo drives are the core components to precise positioning in packaging, labeling, conveying and CNC machining environments.  
- LAP 1 AC Motion Control
- LAP 2 Drive Configuration, Tuning and Operation
- LAP 3 Motion Control System Configuration
- LAP 4 Motion Control System Programming
- LAP 5 Position Control
- LAP 6 Velocity and Current Controls

**MOTION CONTROL (SERVO) LEARNING SYSTEM 2 – ZTEC 521**

Average time for course completion: 24 hours  
Investment: $765  
**PREREQUISITE ZTEC 520 - MOTION CONTROL (SERVO) LEARNING SYSTEM**  
Teaches multi-axis servo drive configurations as essential for synchronizing multiple operations in packaging, labeling, conveying, CNC machining environments and warehouse management systems.  
- LAP 1 Multi-Axis Motion Control Systems
- LAP 2 Motion Control Camming
- LAP 3 Synchronized Motion

**ROBOTICS AND COMPUTER PROGRAMMING – ZTEC 543**

Average time for course completion: 50 hours  
Investment: $1,375  
- LAP 1 Basic Robot Operation
- LAP 2 Basic Robot Programming
- LAP 3 Interfacing & Material Handling
- LAP 4 Application Development
- LAP 5 Flexible Manufacturing Cells
- LAP 6 Quality Control
- LAP 7 Production Control

These courses have an open start date.  
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
Skill Building for Supervisors / Team Leads
This 6-hour workshop presents supervisors and team leads with proven Best Practices to successfully coach and lead highly productive teams.

Key focus areas include:
- Effective Coaching Techniques
- Communication Skills; Giving and Receiving Constructive Feedback
- Effective Time Management Strategies
- Understanding and Supervising Different Generations
- Conflict Management / Dealing with Difficult Behaviors

The Highly Productive Leader
Designed for Supervisors / Team Leads
3 Skill Building Workshops with Clear, Relatable Tools

Session 1 | Awareness | 3 hours
Effective Communication, Team Building
- Defining a good leader, Your role in the workplace
- How do I rate now?, How do I improve?, #1 skill needed to succeed

Session 2 | Empowerment | 3 hours
Leading as a Coach, Performance Management Techniques
- The 5 languages of motivation
- Positive Reinforcement Techniques

Session 3 | Confidence | 3 hours
Communicating with Difficult People, Managing Conflict Handling Stress in the Workplace, Time Management and Goal Setting
- Authentic Leadership – be true to yourself in difficult situations
- Documentation Best Practices

Hands-On 16 Hr Project Management Training
- Review basic project management vocabulary.
- Introduce the activities in each of the Project Management lifecycle process groups as well as the key results of each process group Initiating, planning, executing, monitoring and closing
- Compose a project plan which consists of:
  - A work breakdown structure
  - Scope and objective statements based on a work breakdown structure
  - Communications Plan
  - Risk Handling Plan
- Identify the correct processes and templates useful for the participant’s organization for each Project Management lifecycle process
- Defining effective team building and leadership characteristics
- Developing templates and techniques to schedule, plan and execute effective project planning, communication and status meetings
- Identifying the characteristics of successful projects and project teams

Participants will learn how to:
- Create a work breakdown structure, which is a key enabler in creating the Project Plan
- Establish and maintain project sponsorship, individual team member accountability and stakeholder buy in
- Identify, mitigate and control project risks
- Control scope changes
- Organize successful meetings

Who should attend:
- Project Managers
- Participants that need structured and proven Project Management techniques and tools
- Participants that can benefit from practicing the techniques and tools on their own real projects
- Teams who need to work together to develop a common understanding of how to manage projects regardless of the years that they may have been managing projects
Energy Leadership
A Transformative Leadership Development System Based on 7 Levels of Leadership and 8 Building Blocks That Enable Powerful Changes In You. The Energy Leadership Index (ELI) a one-of-a-kind assessment that will allow you to understand the concept of levels of energy, and how they are related to leadership excellence. You’ll then learn how to shift your energy to present yourself in a way that “inspires greatness” in others.

Your Development Program: Building Your Foundation
• Assess yourself with the Energy Leadership Index
• Undertake program orientation and plan your roadmap
• Learn the 7 levels of leadership
• Identify strengths and gaps to achieve your ideal image

The 8 Building Blocks of the Energetic Leader
• Emotional Intelligence
• Dynamic Communication
• Influencing and Engaging Others
• Problem Solving
• Productivity and Decision Making
• High Energy Relationships
• Health and Wellness
• Time Management and Balance

Stress Management and Burnout Prevention in the Workplace:
Burnout leads to reduced productivity and increased turnover. Together, we can stop it in its tracks. The number one way to help retain employees and keep them engaged is to adopt an overall strategy to support mental health in the workplace.

• Learn the risk of stress and burnout in the workplace
• Recognize the signs you are experiencing burnout and stress in the workplace
• Understand stress isn’t the enemy, it is how we rebound and repair from stress that is important.
• Learning how to complete the stress cycle when it does emerge.
• Gain actionable strategies & tools for supporting yourself and others through stress and to prevent burnout.

Everything DiSC Workplace®
This training and personalized learning experience that can benefit every person in the organization—regardless of title or position, department or function—in building more productive and effective relationships at work. It teaches participants to understand themselves and others, while learning to appreciate different priorities, preferences, and values each individual brings to the workplace. With personalized insights and actionable strategies, participants learn how to adapt to the style of others, ultimately improving engagement, collaboration, and the overall quality of the organization.

• Discovering your DiSC® style
• Understanding the styles of others
• Building more effective relationships
• Exploring People-Reading and Comparison Reports
  - Communication Model
  - Listening Skills and Blocks
• Handling Non-Standard and Out of Scope Requests
• Dealing with Difficult Customer Situations
• Managing Time and Tasks in a Customer Service Environment
• Analyzing a Customer SWOT

One on One Performance Coaching:
This 9-12 hour one on one coaching will be executed in one hour sessions over the course of 9-12 weeks. Key focus areas include:
• Employee Behavior change
• Employee wellness & Stress management
• Leadership Development & Succession planning
• Performance improvement plans (PIPs)
• Culture development

Delivering Superior Customer Service
This 6-hour workshop provides best practice skills and tools to enable your business teams to deliver superior service by managing customer expectations and building customer relationships.

Focus Areas:
• Managing dual roles:
  - Representing the customer to your company
  - Representing your company to the customer
• Determining Customer Wants vs. Needs
• Balancing a Customer vs. Product Focus
• Interacting with Different Customer Personality Types
• Knowing Your Customer's Business
• Communicating Effectively:
  - Communication Types
  - Communication Model
  - Listening Skills and Blocks
• Handling Non-Standard and Out of Scope Requests
• Dealing with Difficult Customer Situations
• Managing Time and Tasks in a Customer Service Environment
• Analyzing a Customer SWOT

Leading in a VUCA Business Environment
Volatility, Uncertainty, Complexity, and Ambiguity
Leaders require more than traditional skills to engage highly productive teams and drive results in today’s “VUCA” business environment. Success is dependent upon not only leaders’ skill sets, but just as importantly, their mindsets.

This 6-hour workshop provides leaders with practices, skills and tools to enable them to effectively lead both themselves and their teams.

Focus Areas:
• Leading Relationally
• Demonstrating Resilience
• Developing Self-Awareness
• Communicating Intentionally
• Practicing Emotional Intelligence
• Prioritizing Time & Tasks
• Delegating Purposefully
• Building & Engaging Teams

Our Workforce Development Team delivers custom training solutions that meet your needs. Contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext 5312
Implementing Change

Chao tic times ahead? Or has your organization been trying to stay afloat on permanent whitewater? Do your leaders just shake their heads when you announce new initiatives? If so, they may be lacking important skills to make it happen. Participants will leave with specific actionable steps that will improve the likelihood of successful change implementation. Four (4) hours in length. Topics covered:

- The process of change; the unique leader role during change
- Assessing workforce reactions to change and improving their effectiveness despite the unknowns
- Communicating about change for maximum positive impact
- Dealing with resistance and turning it into constructive action in support of the change

Course can be customized to incorporate real change initiatives that the company is experiencing so that the participants leave with plans designed to address current issues.

Thriving in Change

Are your employees experiencing “future shock”; lowered effectiveness and general lack of energy to implement the changes that seem to be bombarding them almost daily? Organization change is becoming a permanent condition of the workplace and employees maintain their effectiveness during times of change are more valuable to the organization and generally more satisfied. This workshop is designed for individual contributors who experience change on their jobs and need to be more resilient and more effective during change. Topics covered during this 4-hour session

- The process of change and typical responses to Change
- Opportunity oriented/Danger oriented
- What to expect during change so that it is not as disruptive to them
- It also addresses how they can minimize their own resistance, deal with their emotions and adopt a more effective and productive mindset

Course can be customized to incorporate real change initiatives that the company is experiencing so that the participants leave with specific strategies that will improve their own effectiveness during changes.

Managing Disagreements

This course provides participants with skills that allow them to become more effective in conflict situations that normally occur in the workplace. Through assessments and exercises they will learn to apply tactics which allow them to deal more effectively with their own and other’s responses in conflict situations and to avoid escalating conflict and communication approaches that will de-escalate conflict. Four (4) hours in length. Topics include:

- Identify the underlying sources of disagreements and apply appropriate strategies to manage them
- Deal more effectively with other’s responses when disagreements occur
- Manage self more effectively during disagreements
- Capture the positive outcomes of potential disagreements by understanding the dynamics of different perspectives, pressure points, choice of communication approaches, emotions, power and expectations

Expand Your Impact: Influencing Others

Leaders and individual contributors must use influence on others to sell their ideas, gain support for initiatives and motivate people to perform at their best. Whether influencing their leadership, peers or direct reports, participants will learn multiple approaches to present their ideas in a favorable light and communicate what is needed from others. Building influencing skills builds confidence with tactics and approaches that are consistent with participants’ comfort zones. Emphasis is placed on ethical influencing given organizational realities. Topics covered in this four-hour session:

- Understand and apply knowledge about the context of influencing
- Assess receptivity of your “PTI” (Person to be Influenced)
- Assess and build influencing capability
- Apply effective tactics considering all three “gears of influence”
- Leave with a set of action steps and strategies for influencing your PTI

Present with Confidence

Surveys indicate that more people would rather die than stand up in front of a group and speak. This training program builds confidence, even in the most timid presenters by providing effective tactics, opportunity to practice and constructive feedback. Participants learn proper organization, preparation, how to handle nervousness and audio visuals with ease. Four (4) hours in length. Topics include:

- Utilize your own presentation style with greater comfort getting and keeping your audience’s attention
- Organize your presentations to improve understanding
- Analyze and then adjust your presentation so that your audience’s expectations are met
- Enhance an already good presentation so that your message is delivered effectively
Quickbooks Beginner:  Everything you need to get started with QuickBooks.

This class meets on campus, in person, once a week in two hours sessions. Topics covered in this five week course are the following.

Materials Included.
Investment: $240

Focus Areas:
- Installation & set-up of QuickBooks on the computer
- Creating the company file
- Understand & manipulate the Chart of Accounts
- Setting up Classes
- Working with Inventory
- Setting up Vendors and their requirements
- Setting up Customers
- Tweaking the Icon Bar
- Using the Open Windows List
- Creating Invoices
- Using the Register
- Entering & Paying Bills
- Learn how to Back up and Restore your company file

Quickbooks Advanced:  Everything you need to get started with QuickBooks.

Further your knowledge of QuickBooks with this advanced class that builds on the basics. The class meets on campus, in person, once a week in two house sessions. Topics covered in this five week course are the following.

Materials Included.
Investment $240

Topics covered in this course are the following;

- Learning all of the choices in the Edit, Preferences area
- Do a bank reconciliation statement
- Work with and reconcile a Credit Card statement
- How to enter & pay Sales Tax
- Customize an Invoice with your logo and format
- Create necessary Reports for the tax accountant

Problem Solving and Critical Thinking
(4 hour class or 12 hour class available)

Most leaders and individual contributors spend most of their time at work solving problems. The key to effective problem solving is using accurate information as inputs and then applying logical reasoning and critical thinking in the analysis of that information. Thinking critically about information allows us to avoid common obstacles, test assumptions and identify and correct our misconceptions that result in solutions that don't solve the real problem. This course is customizable to utilize a real problem facing the organization or a simulation that reflects the type of problems the participants will encounter back on the job. This course can be delivered to in-tact Safety Teams who must investigate accidents, intact problem-solving teams or other teams charged with making improvements and recommendations. Four (4) hours in length. Topics covered:

- Identify errors in critical thinking to be avoided when making decisions or solving problems
- Be better prepared to apply critical thinking principles to actual decisions and problems
- Effectively gather data and a variety of perspectives that will help identify the root cause of the problem
- Identify a variety of solutions that could solve the problem and choose the best one
- Choose the best solution and consider the immediate and long-term impacts of solutions on others

Internal Quality Auditor Training
ISO9001:2015 Compliance; 4-hour Workshop

Focus Areas:
Overview of ISO 9001:2015
- Definition of a ISO 9001 Quality System
- Requirements for Internal Audits
- Other Core Requirements

Planning Internal Audits
- Issuing the Yearly Audit Schedule
- Use of an Audit Applicability Matrix
- Creating an Audit Plan

Performing an Audit
- Assignments of the Auditors
- Executing the Audit Plan
- Best Practices for Conducting Audit Interviews

Documenting and Closing an Audit*
- Major & Minor Compliances and Opportunities for Improvement
- Writing and Issuing Non-compliances
- Tracking and Closing Non-compliances

Visit sttc.eventbrite.com to see our current class schedule
Introduction to Office 365 will give the student the basic skills to work with Word, Excel, and Outlook in a five week class.

**Word**
- Proper methods of entering text
- Formatting you text, paragraphs, and the entire document
- Using Auto Correct
- Understanding the controls in the Ribbon area.
- Working with Drag-and-Drop, Cut, Copy, and Paste
- Properly setting up a letter
- Creating bullets & numbering
- Setting up and working with Tabs
- Inserting a picture

**Excel**
- The basic components of the Excel worksheet
- Entering Data
- The 4 mouse components of a cell
- Selecting Cells & Ranges
- Creating a series of text, numbers, or dates
- Saving the Workbook
- Proper methods of editing the worksheet data
- Proper methods of deleting worksheet data
- Inserting & deleting rows, columns, and entire sheets.
- Adjusting row & columns height & width
- Entering Dates into formulas
- Recreating Sheets and removing last year’s data
- Proper methods of printing the spreadsheet.

**Outlook**
- Organizing your e-mails into Folders
- Working with the Contacts area
- Review creating a Distribution List
- Review creating an E-Mail Signature
- Creating a Rule
- Working with Quick Parts

Intermediate Office 365 is designed to give the student more advanced skills to work with Word, Excel, and Outlook in a five week class. This class can be offered in RACC’s computer lab or at your facility.

**Word**
- Creating Bullets & numbering
- Creating Tabs and a Table of Contents
- Working with Auto Correct & Auto Complete
- Using Quick Parts
- Creating a line you can type on!
- Examining the Auto Dictionary

**Excel**
- Recreating Sheets & removing old data
- Working with Range Names
- Creating a spreadsheet with Absolute Referencing
- Using Conditional formatting
- Working with Logical formulas
- Hiding sheets & cells
- Working with large spreadsheets
- Re-arrange column order quickly
- Working with drop down boxes
- Grouping sheets
- Linking sheets & workbooks
- What’s new in Excel 365

**Outlook**
- Organizing your e-mails into Folders
- Working with the Contacts area
- Review creating a Distribution List
- Review creating an E-Mail Signature
- Creating a Rule
- Working with Quick Parts

Our Workforce Development Team delivers custom training solutions that meet your needs. Contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext 5312
SAFETY AND EMERGENCY RESPONSE


**Emergency Response Preparedness**

**Industrial Fire Brigade, Basic**
Provides basic incipient level fire training for general employee groups, or dedicated incipient level fire brigades. Course covers chemistry of fire, hose and nozzles, fire streams, portable fire extinguishers, automatic systems, and live fire fighting exercises on incipient level fires with extinguishers and small hose streams.

**Industrial Fire Brigade, Extended**
Provides fire brigade training per the OSHA Guidelines. Course covers or refreshes all items covered in the Basic Fire Brigade Training Program, plus self-contained breathing apparatus, ropes and knots, ladders, search and rescue practices, and interior structural fire fighting exercises.

**Fire Extinguishers**
Prepares employees to properly and safely react to a fire in their work place. Trains new employees or refreshes current employees in their fire safety responsibilities. Topics covered: basic fire prevention, evacuation, extinguisher selection and use.

**OSHA 10 + 30 Hour - General Industry**
The 10-hour training program is primarily intended for entry level workers. The 30-hour training program is intended to provide workers with some safety responsibility a greater depth and variety of training. All training is intended to cover an overview of the hazards a worker may encounter on a job site. Training emphasizes hazard identification, avoidance, control and prevention.

**Hazardous Materials Awareness (HAZWOPER)**
Recognize the presence of a hazardous material/WMD and to call for trained personnel to assist, secure and protect the area. This course will meet the requirement for annual review under 29 CFR 1910.120 for emergency response.

**Hazardous Materials Operations (HAZWOPER)**
Comply with Operations Level training identified in the NFPA 472 Core Competencies and in the Hazardous Materials Waste Operations and Emergency Response regulations.

**Hazardous Materials Technician (HAZWOPER)**
Recognize the presence of a hazardous material or WMD, select applicable decontamination procedures, and control a release using specialized protective clothing and control equipment and meet the competencies at the awareness and operations level.
Rigging skills are required in many industries including manufacturing, construction, and transportation. Give your employees a head start by teaching them these rigging concepts and applications. These courses teach your employee how to safely move loads of different shapes and sizes using a variety of methods. Hands-on, applied skills include installing an eyebolt for lifting, calculating crush force, assembling and lifting a load using a two-leg wire rope bridle sling with shackles, and many more. These courses utilize our 1-ton rated gantry crane to replicate various on-the-job load movement applications using component storage, hoists, slings, loads and load fittings.

**RIGGING SYSTEMS 1 - ZTEC 357**
Average time for course completion: 35 hours
Investment: $809
LAP 1  Introduction to Rigging
LAP 2  Hoists
LAP 3  Slings and Lifting
LAP 4  Wire Rope
LAP 5  Chain Slings
LAP 6  Fiber Rope
LAP 7  Industrial Cranes

**RIGGING SYSTEMS 2 - ZTEC 358**
Average time for course completion: 15 hours
Investment: $359
LAP 1  Wire Mesh Slings
LAP 2  Synthetic Slings
LAP 3  Equipment Movement
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Cover Image</th>
<th>Description</th>
<th>Average Time</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZTEC 311</td>
<td>MECHANICAL DRIVES 1</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 35 hours</td>
<td>LAP 1: Intro to Mechanical Drive Systems&lt;br&gt;LAP 2: Key Fasteners&lt;br&gt;LAP 3: Power Transmission Systems&lt;br&gt;LAP 4: Intro to V-Belt Drives&lt;br&gt;LAP 5: Intro to Chain Drives&lt;br&gt;LAP 6: Spur Gear Drives&lt;br&gt;LAP 7: Multiple Shaft Drives</td>
<td>$895</td>
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<tr>
<td>ZTEC 312</td>
<td>MECHANICAL DRIVES 2</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 35 hours</td>
<td>LAP 1: Heavy-Duty V-Belt Drives&lt;br&gt;LAP 2: V-Belt Selection and Maintenance&lt;br&gt;LAP 3: Synchronous Belt Drives&lt;br&gt;LAP 4: Lubrication Concepts&lt;br&gt;LAP 5: Precision Shaft Alignment&lt;br&gt;LAP 6: Couplings&lt;br&gt;LAP 7: Heavy-Duty Chain Drives</td>
<td>$895</td>
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<tr>
<td>ZTEC 300</td>
<td>BASIC HYDRAULICS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 20 hours</td>
<td>LAP 1: Hydraulic Power Systems&lt;br&gt;LAP 2: Basic Hydraulic Circuits&lt;br&gt;LAP 3: Principles of Hydraulic Pressure and Flow&lt;br&gt;LAP 4: Hydraulic Speed Control&lt;br&gt;LAP 5: Pressure Control Circuits</td>
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<td>ZTEC 301</td>
<td>INTERMEDIATE HYDRAULICS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 25 hours</td>
<td>LAP 1: Hydraulic DCV Applications&lt;br&gt;LAP 2: Hydraulic Cylinder Applications&lt;br&gt;LAP 3: Hydraulic Relief Valve Operation&lt;br&gt;LAP 4: Hydraulic Check Valve Applications&lt;br&gt;LAP 5: Accumulator Applications</td>
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<td>ZTEC 308</td>
<td>HYDRAULIC TROUBLESHOOTING</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 45 hours</td>
<td>LAP 1: Introduction to Pressure-Compensated Pumps&lt;br&gt;LAP 2: Pressure-Compensated Pump Performance&lt;br&gt;LAP 3: Troubleshooting Hydraulic Pumps&lt;br&gt;LAP 4: Troubleshooting Hydraulic Actuators&lt;br&gt;LAP 5: Troubleshooting Hydraulic DCVs&lt;br&gt;LAP 6: Troubleshooting Flow Control and Check Valves&lt;br&gt;LAP 7: Troubleshooting Pressure Control Valves&lt;br&gt;LAP 8: Troubleshooting Unloader and Counter Balance Valves&lt;br&gt;LAP 9: Troubleshooting Hydraulic Systems</td>
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<td>ZTEC 305</td>
<td>BASIC PNEUMATICS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 16 hours</td>
<td>LAP 1: Pneumatic Power Systems&lt;br&gt;LAP 2: Basic Pneumatic Circuits&lt;br&gt;LAP 3: Principles of Pneumatic Pressure and Flow&lt;br&gt;LAP 4: Pneumatic Speed Control Circuits</td>
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<td>ZTEC 306</td>
<td>INTERMEDIATE PNEUMATICS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 15 hours</td>
<td>LAP 1: Pneumatic DCV Applications&lt;br&gt;LAP 2: Air Logic&lt;br&gt;LAP 3: Pneumatic Maintenance</td>
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<td>ZTEC 309</td>
<td>PNEUMATIC TROUBLESHOOTING</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 35 hours</td>
<td>LAP 1: Pneumatic Troubleshooting&lt;br&gt;LAP 2: Air Preparation Troubleshooting&lt;br&gt;LAP 3: Troubleshooting Pneumatic Cylinders&lt;br&gt;LAP 4: Motor &amp; Rotary Actuator Troubleshooting&lt;br&gt;LAP 5: Troubleshooting DCV &amp; Flow Control Valves&lt;br&gt;LAP 6: Troubleshooting Vacuum Systems&lt;br&gt;LAP 7: Troubleshooting Pneumatic Systems</td>
<td>$869</td>
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<td>ZTEC 315</td>
<td>FLOOR STANDING CONVEYORS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 4 hours</td>
<td>LAP 1: Intro to vibration analysis&lt;br&gt;LAP 2: Vibration condition monitoring&lt;br&gt;LAP 3: Vibration analysis</td>
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<td>ZTEC 316</td>
<td>VIBRATION ANALYSIS</td>
<td><img src="racc.edu" alt="Image" /></td>
<td>Average time for course completion: 12 hours</td>
<td>LAP 1: Intro to vibration analysis&lt;br&gt;LAP 2: Vibration condition monitoring&lt;br&gt;LAP 3: Vibration analysis</td>
<td>$349</td>
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AC/DC ELECTRICAL SYSTEM – ZTEC 205
Average time for course completion: 30 hours
Investment: $750
LAP 1 Basic Electrical Circuits
LAP 2 Electrical Measurements
LAP 3 Circuit Analysis
LAP 4 Inductance and Capacitance
LAP 5 Combination Circuits
LAP 6 Transformers

ELECTRICAL RELAY CONTROL SYSTEMS – ZTEC 231
Average time for course completion: 15 hours
Investment: $359
LAP 1 Control Logic
LAP 2 Sequencing Control
LAP 3 Timers and Advanced Systems

ELECTRIC MOTOR CONTROL – ZTEC 207
Average time for course completion: 50 hours
Investment: $1,245
LAP 1 Introduction to Electric Motor Control
LAP 2 Manual Motor Control and Overload Protection
LAP 3 Control Transformers Control
LAP 4 Ladder Logic
LAP 5 Control Relays and Motor Starters
LAP 6 Introduction to Troubleshooting
LAP 7 System Troubleshooting
LAP 8 Reversing Motor Control
LAP 9 Automatic Input Devices
LAP 10 Basic Timer Control: On-Delay and Off-Delay

ELECTRICAL POWER DISTRIBUTION – ZTEC 210
Average time for course completion: 25 hours
Investment: $635
LAP 1 Introduction to Raceways
LAP 2 Basic Conduit Bending
LAP 3 Advanced Raceways
LAP 4 Conductors, Disconnects and Overcurrent Protection
LAP 5 Conduit Sizing and Wire Pulling Techniques

ELECTRICAL CONTROL SYSTEM WIRING – ZTEC 209
Average time for course completion: 10 hours
Investment: $295
LAP 1 Introduction to Electrical Control Wiring
LAP 2 Electrical Control System Wiring

ADVANCED ELECTRIC MOTOR CONTROLS – ZTEC 208
Average time for course completion: 50 hours
Investment: $1,245
LAP 11 Motor Braking System
LAP 12 Reduced Voltage Starting Circuits
LAP 13 Power Generation and Distribution
LAP 14 Electronic Sensors
LAP 15 Timers and Counters
LAP 16 Variable Frequency AC Drive
LAP 17 Variable Frequency AC Drive, Speed & Torque Control
LAP 18 Variable Frequency Drives Acceleration, Deceleration, & Braking
LAP 19 Variable Frequency Drives Fault Diagnostics and TS
LAP 20 SCR Speed Motor Control

AC ELECTRONIC DRIVES – ZTEC 400
Average time for course completion: 35 hours
Investment: $895
LAP 1 Introduction to AC Drives
LAP 2 Configuring A-B PowerFlex 70 Drives
LAP 3 A-B PowerFlex 70 Control Parameters
LAP 4 Communications and Diagnostics for A-B PowerFlex 70 Drives
LAP 5 Troubleshooting A-B PowerFlex 70 Drives
LAP 6 Configuring and Troubleshooting the A-B PowerFlex 40 Drive
LAP 7 Configuring and Troubleshooting Servo Drives

DC ELECTRONIC DRIVES – ZTEC 401
Average time for course completion: 30 hours
Investment: $755
LAP 1 Introduction to DC Motion Control
LAP 2 Basic DC Drives - SCR Control
LAP 3 DC Spindle Drives
LAP 4 DC Axis Drives
LAP 5 DC Pulse Width Modulation Drives
LAP 6 DC Drive Troubleshooting
SUPPLY CHAIN/ WAREHOUSING PLANT TECHNICIAN SPECIALTY

CONTROLS & SMART AUTOMATION TRAINING

PLC ALLEN BRADLEY COMPACTLOGIX - L16 - ZTEC 454
Average time for course completion: 80 hours
Investment: $2,025
LAP 1 - Introduction to Programmable Controllers
LAP 2 - Basic PanelView Terminal Operation
LAP 3 - PLC Program Operations
LAP 4 - PLC Programming
LAP 5 - PLC Motor Control
LAP 6 - PLC Timer and Counter Instructions
LAP 7 - Event Sequencing
LAP 8 - Program Control Instructions
LAP 9 - Math and Data Move Instructions
LAP 10 - PanelView Plus Application Editing
LAP 11 - PanelView Plus Application Editing 2
LAP 12 - Analog Inputs
LAP 13 - Analog Outputs
LAP 14 - Variable Output Applications

INTRODUCTION TO SMART AUTOMATION AND INDUSTRIAL INTERNET OF THINGS (IIOT) - ZTEC 905
Average time for course completion: 65 Hours
Investment: $1,695

Topics include:
- Automation Operations
- Cloud Based Data Acquisition
- Programmable Logic Controller Operation (Allen-Bradley Micro820)
- Basic PLC Programming
- PLC Motor Control
- PLC Timer and Counter Instructions
- Pick and Place Feeding
- Smart Sensors
- PLC Event Sequencing
- Database Concepts
- Indexing
- Sorting and Parts Storage
- Automated Storage and Retrieval Systems

These courses have an open start date.
Contact 610.372.4721, ext 5716 or jvecchio@racc.edu for details.
Program Description - This 180-hour certification program prepares you for licensing as a wastewater treatment plant operator. The curriculum was developed by the Pennsylvania Department of Environmental Protection (DEP) to prepare for the DEP's Operator Certification Exams. Combining this program with work at a local treatment facility will prepare participants for licensing.

How You Will Learn - We combine course work with onsite visits to local Wastewater Treatment facilities, plus interactive class discussion with certified operators, out of class assignments, and module end exams.

PROGRAM COMPONENTS

**ZWTR 120 – 90 HRS – FALL 2022 - $1,495**
**Component 1: Intro to Wastewater Treatment – 18 hours**
- Fundamentals of Wastewater Treatment
- General Math, General Chemistry

**Component 2: Collection System – 18 hours**
- Wastewater Collection System I & II
- Land Application of Wastewater
- Infiltration & Inflow/Wet Weather
- Solids Handling & Disposal
- Pumps & Hydraulics, Intro & Advanced Flow Meter
- Sequential Batch Recorders, Biosolids, Chemical Feed Systems

**Component 4: Miscellaneous Topics – 18 hours**
- Energy Efficiency
- SOP Preparation/NPDES Permit
- Discharge Monitoring Reports
- Administration of Treatment Plants
- Industrial Pretreatment

**Component 5: Laboratory and Maintenance – 18 hours**
- Wastewater Laboratory Basics
- Treatment Plant Maintenance

**ZWTR 121 – 90 Hrs - Spring 2023 - $1,495**
**Component 6: Treatment Types – 18 hours**
- Ponds & Lagoons
- Trickling Filter Process
- Rotating Biological Contactors

**Component 7: Land Applications & Solids – 18 hours**
- Land Application of Wastewater
- Solids Handling and Disposal
- Sequential Batch Recorders
- Biosolids

**Component 8 & 9: Activated Sludge – 36 hours**
- Activated Sludge Math
- Activated Sludge 1-4

**Component 10: Advanced Topics – 18 hours**
- Communication Techniques
- Disinfection and Chlorination
- Effluent Filtration
- Advanced Wastewater Treatment

Learn More - Contact Chris Bashore at cbashore@racc.edu or call 610.374.4721 Ext 5176

To Register By Phone (610.607.6235) | Register On-line at racc.edu/CommReg

Cost for the full 180-hour certification program for program year 2022-23 is $2,990. The second half of the program includes a scholarship opportunity.
ELECTRIC UTILITY TECHNOLOGY (EUT)

First Energy Lineman and Substation - Associate Degree Program

What's Your Goal?
If your goal is to start or improve your career in the electric utility field as an Electrical Line or Substation Worker, then completion of RACC’s Electric Utility Technology Associate of Applied Science degree is a great place to start.

We Help You Get There With . . .
• Lecture class sizes of 33 students or fewer
• Engaging classroom experiences
• Hands-on training
• Learner-focused faculty

Program Description
This program is offered in partnership with FirstEnergy. Students gain knowledge and skills in AC/DC electricity, electrical circuits, electrical control wiring, wiring systems, transformers, power generation and power distribution. In addition to classroom and laboratory instruction, students also participate in hands-on training at a local FirstEnergy electric utility company training facility.

Enrollment in the program is restricted by a selection process conducted by FirstEnergy and employment for graduates with FirstEnergy is not guaranteed.

Career Outlook
Electrical Line and Substation Workers are in high demand with an expected increase of 15% in employment in Pennsylvania from 2012 to 2022 and 190 job openings every year in the state.

What You Will Learn
• The OSHA safety guidelines for the electric utility industry.
• The operation of equipment used in the maintenance and repair of electric utility systems.
• The experience and knowledge needed for a Commercial Drivers License (CDL).
• The skills to work on above ground and underground circuits and de-energized and energized circuits

Admission Requirements
• Be a graduate of an approved secondary school or hold a high school equivalency diploma (GED®).
• Complete and submit the RACC Application for Admission.
• Students must complete a placement test to assess writing and math levels. If you have completed a college level Math and or English course with a C- or better at another institution, please submit your college transcript to RACC as soon as possible. Additional coursework may be required before the June selection deadline.

Course Completion Information
• Students must be accepted into FirstEnergy’s Power Systems Institute program and meet the following additional requirements in order to be considered for the program: Technical Evaluation, Physical Capabilities Assessment, Background Check, DOT Medical Examiner’s Certificate, Potential Drug Test, Qualifying School and an Interview.
• The number of students who can be accepted into FirstEnergy’s Power Systems Institute is limited due to operational staffing needs.

Interested new students must attend a virtual information session.
Sign up at: racc.edu/psi

To learn more about the program, visit: racc.edu/psi

Please contact Daniel Czerny at dczerny@racc.edu or 610-372-4721 x5130 for additional information on this program.