



WORKFORCE

SCHMIDT TRAINING & TECHNOLOGY CENTER

FALL 2026

 **KURT**

Reading Area
Community College

RACC

racc.edu

Ten South Second Street, Reading, PA | 610.372.4721 | 1.800.626.1665 | racc.edu

CELEBRATING 20 YEARS



The Schmidt Training and Technology Center is named in honor of Rolf Schmidt, who immigrated to the United States in 1957 with his wife, Renate, and their daughter. Arriving with just \$2.40 worth of Deutschmark in his pocket, Rolf quickly began building a new life—learning to drive, purchasing an old car, securing work, and starting a new career within weeks. Shortly after, the rest of the Schmidt family joined him in America to continue establishing their lives and futures.

In 1970, Rolf and his brother Bill co-founded Sharpoint, Inc., a Reading-based manufacturer of precision surgical needles, sutures, and scalpels. In 1985, the company sold its core ophthalmic division to Nestlé's Alcon Laboratories, the primary marketer of Sharpoint products. Soon after, the remaining assets were purchased through a local management buyout, forming what became Surgical Specialties, Inc.

Rolf's deep commitment to Reading Area Community College stemmed from his own appreciation for education. His involvement with RACC began in 1990 when he was appointed by the Berks County Board of Commissioners to a task force studying the feasibility of broader college sponsorship. As co-chair, he recommended that Berks County sponsor RACC—a pivotal decision that helped transform the college into a respected center for accessible, high-quality education.

Rolf's dedication to educational excellence ultimately led to the creation of the Schmidt Training and Technology Center. In November 2003, he spearheaded a \$2.5 million fundraising campaign to construct the facility on the RACC campus, contributing \$1 million of his own toward the \$10 million project. The center, named in his honor, opened in spring 2006.

Today Rolf Schmidt's legacy lives on. We continue his vision by providing manufacturers and students with high-quality, experiential technical training and essential business skills.



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 \$50,000 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 \$17.38 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.
- Must be legally eligible to work in the United States.

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, 2026 and be completed on or before June 30, 2026. 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.

** Courses in this catalog are eligible for WEDnet reimbursement.*



Contact David Lerch to discuss detailed company guidelines and to start the application process for funding. 610.372.4721 x6208 or WEDnet@racc.edu



WORKFORCE

READING AREA COMMUNITY COLLEGE

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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 (610.372.4721). 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.

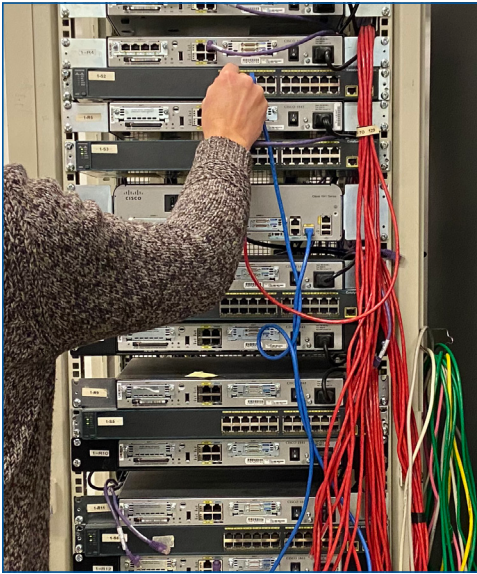
For more information on our graduation rates, the median debt of students who have completed programs and other important information, please visit our website at racc.edu/HEOA.



WORKFORCE

READING AREA COMMUNITY COLLEGE

SCHMIDT TRAINING & TECHNOLOGY CENTER



Information Technology Lab



Machining Lab



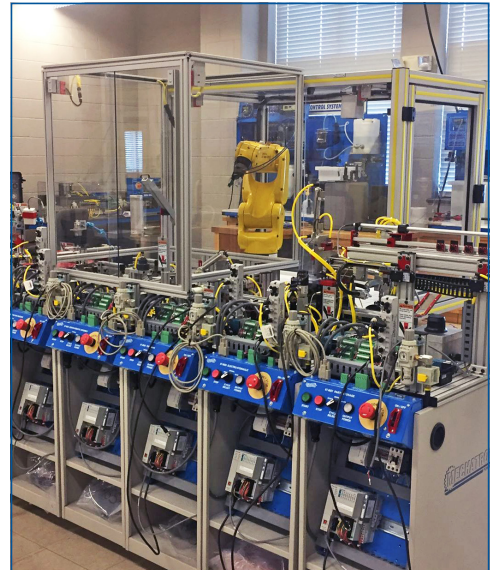
Mechanical Lab



Electrical Lab



PLC Networking Lab



Smart Automation & Robotics Lab

CERTIFICATE AND DEGREE PROGRAMS INDUSTRIAL MAINTENANCE TECHNICIAN, MECHATRONICS AAS

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 (ADVANCED MANUFACTURING INTEGRATED SYSTEMS)

MET 120 Industrial Mechanical - Hydraulics Track ZTEC 356

Approximately 162 hours of training,
5 college credits
Investment: \$4,935
Traditional or Hybrid Learning

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

OR*

MET 120 Industrial Mechanical - Pneumatics Track ZTEC 371

Approximately 162 hours of training,
5 college credits
Investment: \$4,935
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

MET 130 Industrial Electrical ZTEC 227

Approximately 120 hours of training,
4 college credits
Investment: \$3,535
Traditional or Hybrid Learning

- Electrical Control Circuits
- Electrical Motor Control
- Electronic Sensors
- Relay Control Systems
- Residential/Commercial Wiring
- Industrial Electrical Wiring
- Industrial Power Distribution

MET 140-A *Siemens S7-1200 ZTEC 402

Approximately 80 hours of training,
2 college credits
Investment: \$2,230
Traditional or Hybrid Learning

- Introduction to Programmable Controllers
- Basic HMI Panel Operations
- Basic PLC Programming
- PLC Motor Control
- PLC Timer & Counter Instruction
- Event Sequencing
- Program Control Instructions
- Math & Data Move Instructions
- HMI Application Editing
- Analog Inputs & Outputs
- PLC Motion Control

AMIST 2 (ADVANCED MANUFACTURING INTEGRATED SYSTEMS)

MET 150 Industrial Mechanical 2 - Hydraulics Track ZTEC 369

Approximately 170 hours of training,
6 college credits
Investment: \$4,860

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

OR*

MET 150 Industrial Mechanical 2 - Pneumatics Track ZTEC 375

Approximately 170 hours of training,
6 college credits
Investment: \$4,860

- 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
- Hydraulic Maintenance
- Hydraulics 2
- Hydraulic Troubleshooting

MET 160 Industrial Electrical 2 ZTEC 242

Approximately 115 hours of training,
3 college credits
Investment: \$2,480

- Basic Electrical Machines System
- Advanced Electric Motor Controls
- DC Electronic Drives
- AC Electronic Drives
- PLC/VFD Wiring

MET 140-B *Siemens S7-1200 ZTEC 433

Approximately 40 hours of training,
2 college credits
Investment: \$1,130

- Introduction to PLC Troubleshooting
- PLC Systems Troubleshooting
- Analog Input/Output Troubleshooting
- Analog Application Troubleshooting

* Industry may request an SLC 500 substitution for A and B.

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 (ADVANCED MANUFACTURING INTEGRATED SYSTEMS)

MET 200

Industrial Robotics and Motion Control ZTEC 531

Approximately 140 hours of training,
4 college credits

Investment: \$4,635

- Robotics & Computer Programming
- General Purpose Motion Control System
- Multi-Axis Motion Control System

MET 210

Process Control & Industrial Instrumentation ZTEC 437

Approximately 90 hours of training,
3 college credits

Investment: \$2,810

MET 220

Advanced Industrial PLC AB ControlLogix ZTEC 438

Approximately 170 hours of training,
4 college credits

Investment: \$4,395

- Introduction to programmable controllers
- Basic PLC Programming
- PLC Motor Control
- Discrete I/O Interfacing
- Intro to PLC Troubleshooting
- PLC Systems Troubleshooting
- Event Sequencing
- Application Development
- PLC timer instructions
- PLC counter instructions

- Program Control Instructions
- Math and Data Move Instructions



AMIST 4 (ADVANCED MANUFACTURING INTEGRATED SYSTEMS)

MET 111

Manufacturing Fundamentals ZTEC 561

Approximately 30 hours of training
1 college credit - hybrid learning

Investment: \$625

- Principles of Advanced Manufacturing
Introduces typical plant processes such as CNC, PLC and Automation
Reviews typical plant layouts for efficient manufacturing
Manufacturing personnel and their responsibilities
- Lean Manufacturing
Introduces principles and methods of workplace organization using 5s methods
- Communication Skills
Importance of effective communication, listening skills, and feedback
- Safety Practices and Regulations
Reviews basic workplace safety concepts and practices
- Personal Protection Equipment
Reviews the importance of Personal Protective Equipment (PPE)
Identifies the potential hazards that require PPE
Types of PPE required for different types of hazards
The worker's role in following PPE guidelines and requirements

MET 240

Capstone Class: Mechatronics Application Project ZTEC 522

Approximately 120 hours of training
3 college credits

Investment: \$3,520

This course provides students the opportunity to apply skills and knowledge gained from training in the electrical, mechanical and process control program areas to an independent mechatronics project. The student, working with another student or an instructor, will develop and implement a project plan that will demonstrate the student's ability to integrate the skills and knowledge learned.

- 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

MET Courses Plus General Education Requirements*

*Gen Ed Courses AAS Degree	29 cr.
CSS 103 College Success Strategies	3 cr.
MAT 160 College Algebra	3 cr.
COM 121 or 122 English Composition	3 cr.
PHY 240 Physics I	4 cr.
IFT 110 Microcomputer Applications	3 cr.
SOC 130 Sociology	3 cr.
Select one	4cr.
BIO 150, Biology I	
CHEM 150, Chemistry I	
PHY 245, Physics II	
COM 141 Technical Writing	3 cr.
HUM 100 Critical Thinking	3 cr.

PICK AND CHOOSE - GET CERTIFIED IN JUST WHAT YOU NEED.

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 **AutoCAD**
- 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 9-12

Precision Machining Level 1



National Institute for Metalworking Skills®

ENTRY LEVEL CNC MACHINE OPERATOR

BASIC CNC OPERATION

(Z)MTT-100

\$3,625

Skills needed for the operation of the CNC mill, CNC lathe and CNC grinder. Preparation for NIMS Level I certificate: CNC Mill Operation. Includes OSHA 10-hour General Industry Training Program. **150 hours**

BASIC CNC LATHE OPERATION

(Z)MTT-101

\$645

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

\$1,920 (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

\$1,920 (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**

Precision Machining Level 2

TURNING TECHNOLOGY LEVEL I

(Z)MTT-157

\$1,920 (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

\$1,920 (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 and techniques so that students can operate the machines safely and with a high degree of accuracy. Preparation to take the NIMS Level I certification: **75 hours**

BLUEPRINT READING

(Z)MTT-132

\$1,865 (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

\$1,865 (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**

Flexible start times available

These courses have an open start date.

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

Precision Machining Level 3

MILLING TECHNOLOGY LEVEL II (Z)MTT-212

Time: 75 hours

Cost: \$1,920 (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.

TURNING TECHNOLOGY LEVEL II (Z)MTT-225

Time: 75 hours

Cost: \$1,920 (textbook additional)

Knowledge, practical learning experience and accident prevention awareness required to perform advanced conventional lathe job planning, set-up and operation. Aspects of conventional, carbide and other tooling materials selection, preparation, and usage will be covered. Preparation for NIMS Level II certification: Turning between Centers and Chucking.

CNC MILL LEVEL I (Z)MTT-185

Time: 75 hours

Cost: \$2,030 (textbook additional)

Teaches FANUC "G" and "M" code programming along with set-up and operation of CNC Milling Centers. Designed by FANUC to teach CNC Programming, Set-up and Operation for Machining Centers. Preparation for NIMS CNC Milling Level 1 Programming and Operation exam.



National Institute for Metalworking Skills®

ENGINEERING GRAPHICS WITH SOLIDWORKS

ZMTT 107

Average time for course completion: 45 hours

Investment: \$1,315

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. Students will learn the foundation skills of **Solidworks**.



Flexible start times available

These courses have an open start date.

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

Precision Machining Level 4

Plus General Education Requirements*

CNC MILLING II

(Z)MTT-272

\$2,030



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

\$1,865

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

*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

\$1,920 (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

\$2,030



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

\$1,370 (textbook additional)

Teaches CAD software design of production ready jigs and fixtures. Design features and methods will be discussed.

45 hours



Flexible start times available

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

COMPUTER AIDED DESIGN (CAD)/QUALITY

AUTOCAD - ZMTT 310

Average time for course completion: 36 hours

Investment: \$910

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: \$1,315

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. Students will learn the foundation skills of **Solidworks**.

AUTODESK FUSION 360

ZMTT 330

Average time for course completion: 45 hours

Investment: \$1,315

Learn to use Autodesk Fusion 360 to create 3D part models, 2D part drawings and assemblies.



Mitutoyo CRYSTA-Apex V544 CNC Coordinate Measuring Machine



The CRYSTA-Apex V series is a new generation CNC CMM that delivers great versatility and speed while leveraging IoT technologies for smart factory opportunities. The CRYSTA-Apex V provides accuracy that is unmatched by any previous general purpose measuring machine for small to mid-sized workpieces.

- SMS (Smart Measuring System) – system for on-line monitoring and operational status of a measuring machine with data visualization to enable product quality improvement
- Real-time CMM and workpiece temperature compensation (standard feature)
- High-speed optimal path scanning with high-speed active scanning
- Multi-sensor support with an array of contact and non-contact probes that includes tactile, scanning, laser, optical, surface finish measuring

AUTODESK INVENTOR

ZMTT 320

Average time for course completion: 45 hours

Investment: \$1,315

Learn to use Autodesk Inventor to create 3D part models, 2D part drawings and assemblies.

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

Hand Tools, Safety, Quality

MECHANICAL FABRICATION

BASIC SKILLS - ZTEC 390

Average time for course completion: 32 hours

Investment: \$675

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: \$305

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: \$1,140

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: \$1,320

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: \$2,625

- 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
- Blueprint 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 567

Average time for course completion: 45 hours

Investment: \$899

LAP 1	Basic Measurement
LAP 2	Threaded Fasteners
LAP 3	Wrenches
LAP 4	Pneumatic System fabrication
LAP 5	Screwdrivers
LAP 6	Pliers and Locking Devices
LAP 7	Mallets and Non-Threaded Fasteners
LAP 8	Torque Wrenches
LAP 9	Portable Power Tools
LAP 10	Basic Electrical Circuits
LAP 11	Electrical Measurements



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

Hydraulics

BASIC HYDRAULICS - ZTEC 300

Average time for course completion: 20 hours

Investment: \$585

- 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: \$670

- 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: \$399

- 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: \$1,230

- 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

HYDRAULIC MAINTENANCE - ZTEC 3017

Average time for course completion: 20 hours

Investment: \$670

- LAP 1 Hydraulic Filter Maintenance
- LAP 2 Hydraulic Fluid Maintenance
- LAP 3 Fittings and Seals
- LAP 4 Hose and Clamping Devices
- LAP 5 Tubing and Component Installation

Rigging

RIGGING SYSTEMS 1 - ZTEC 357

Average time for course completion: 35 hours Investment: \$890

- 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: \$395

- LAP 1 Wire Mesh Slings
- LAP 2 Synthetic Slings
- LAP 3 Equipment Movement

Pneumatics

BASIC PNEUMATICS - ZTEC 305

Average time for course completion: 16 hours

Investment: \$450

- 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: \$395

- 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: \$395

- 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: \$960

- 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: \$175

Lubrication

CENTRAL LUBRICATION - ZTEC 318

Average time for course completion: 20 hours

Investment: \$545

- 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



Mechanical Drives

Pumps, Piping

MECHANICAL DRIVES 1 – ZTEC 311 is a prerequisite for ALL Mechanical Drives and Pumps courses on this page.

MECHANICAL DRIVES 1 – ZTEC 311

Average time for course completion: 35 hours

Investment: \$985

- 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: \$985

- 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: \$985

- 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: \$565

- 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: \$175

VIBRATION ANALYSIS – ZTEC 316

Average time for course completion: 12 hours

Investment: \$385

- LAP 1 Intro to vibration analysis
- LAP 2 Vibration condition monitoring
- LAP 3 Vibration analysis

These courses have an open start date.

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

LASER ALIGNMENT – ZTEC 317

Average time for course completion: 8 hours

Investment: \$265

- 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: \$580

- 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: \$175

PERISTALTIC PUMP – ZTEC 321

Average time for course completion: 4 hours

Investment: \$175

MAGNETIC PUMP – ZTEC 322

Average time for course completion: 4 hours

Investment: \$175

CENTRIFUGAL PUMP /STUFFING BOX – ZTEC 323

Average time for course completion: 4 hours

Investment: \$175

MULTIPLE PUMP LEARNING SYSTEM – ZTEC 352

Average time for course completion: 4 hours

Investment: \$175

GEAR PUMP – ZTEC 353

Average time for course completion: 4 hours

Investment: \$175

PISTON PUMP – ZTEC 354

Average time for course completion: 4 hours

Investment: \$175

TURBINE PUMP – ZTEC 372

Average time for course completion: 4 hours

Investment: \$175

PIPING SYSTEMS – ZTEC 310

Average time for course completion: 35 hours

Investment: \$1,020

- 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

Electrical Systems, Controls, Rotating Equipment

AC/DC ELECTRICAL SYSTEM - ZTEC 205

NEW TO ELECTRICAL? START HERE.

Average time for course completion: 30 hours

Investment: \$825

- 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

ELECTRIC MOTOR CONTROL - ZTEC 207

Average time for course completion: 50 hours

Investment: \$1,370

- 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: \$1,370

- 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

ELECTRICAL CONTROL SYSTEM WIRING - ZTEC 209

Average time for course completion: 10 hours

Investment: \$325 (Allen Bradley or Siemens)

- LAP 1 Introduction to Electrical Control Wiring
- LAP 2 Electrical Control System Wiring
- LAP 3 Pneumatic Control Circuit Wiring

Prerequisite ZTEC 205 & 207

ELECTRICAL RELAY CONTROL SYSTEMS - ZTEC 231

Average time for course completion: 15 hours

Investment: \$395

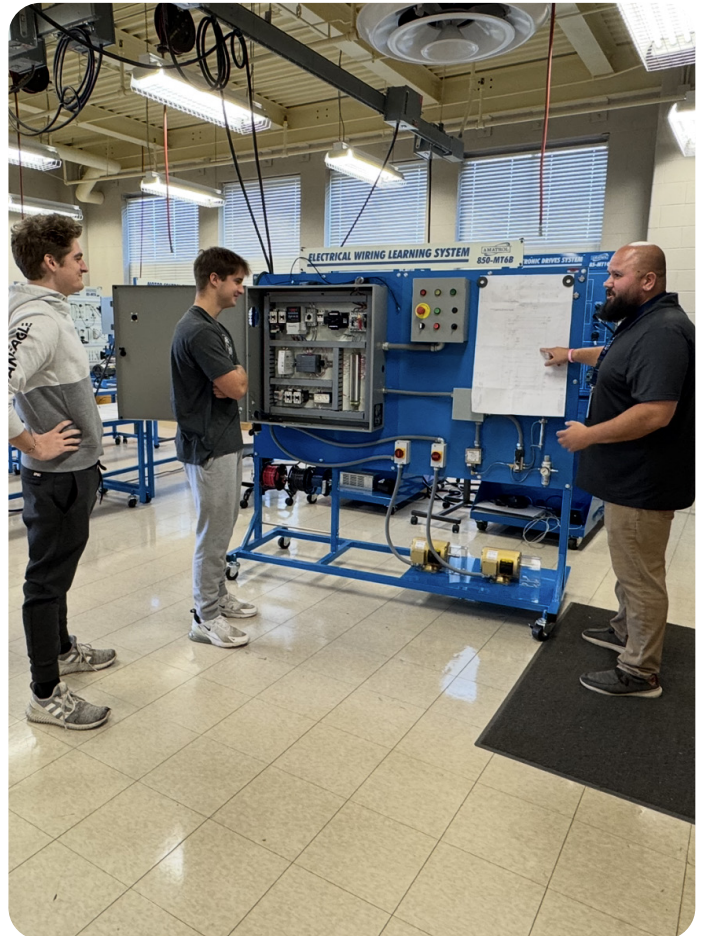
- LAP 1 Control Logic
- LAP 2 Sequencing Control
- LAP 3 Timers and Advanced Systems

PLC AND VFD ELECTRICAL CONTROL WIRING - ZTEC- 267

Average time for course completion: 5 hours

Investment: \$175

Prerequisite ZTEC 209 Electrical Control System Wiring



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

Electrical Systems, Controls, Rotating Equipment

ROTATING ELECTRICAL MACHINES - ZTEC 206

Average time for course completion: 32 hours

Investment: \$910

- 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: \$265

- 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: \$385

- 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: \$699

- 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 FABRICATION - ZTEC 253

Average time for course completion: 12 hours

Investment: \$270

- LAP 1 Introduction to Electrical System
- LAP 2 Residential Wiring System Components
- LAP 3 Service Connections and Circuit Protection

ELECTRO-FLUID POWER SYSTEM - ZTEC 303

Average time for course completion: 40 hours

Investment: \$1,055

- 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

ELECTRONIC SENSORS - ZTEC 304

Average time for course completion: 8 hours

Investment: \$265

- LAP 1 Introduction to Electronic Sensors
- LAP 2 Electronic Sensor Applications

POWER & CONTROL ELECTRONICS - ZTEC 252

Average time for course completion: 50 hours

Investment: \$1,340

- 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

AC ELECTRONIC DRIVES - ZTEC 400

Average time for course completion: 35 hours

Investment: \$985

- 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: \$830

- 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

Allen - Bradley

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: \$2,230

- LAP 1 Introduction to Programmable Controllers
- LAP2 Basic PLC Programming
- LAP3 PLC Motor Control
- LAP 4 Discrete I/O Interfacing
- LAP 5 Intro 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: \$430

- LAP 13 Analog Input Modules
- LAP 14 Analog Output Modules
- LAP 15 Analog Scaling

PLC ALLEN-BRADLEY SLC500 DATA HIGHWAY 485 - ZTEC 404

Average time for course completion: 10 hours
Investment: \$270

- 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: \$430

- LAP 17 Introduction to Panelview
- LAP 18 Panelview Application Editing 1
- LAP 19 Panelview Application Editing 2

**NOW IN A
STUDIO 5000
ENVIRONMENT**



PLC ALLEN-BRADLEY CONTROLLOGIX PROGRAM- MING WITH TROUBLESHOOTING - ZTEC 406

Average time for course completion: 80 hours
Investment: \$2,230

- 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 ALLEN-BRADLEY CONTROLLOGIX ANALOG INPUT/OUTPUT - ZTEC 407

Average time for course completion: 20 hours
Investment: \$580

- LAP 13 Analog Input Modules
- LAP 14 Analog Input Configuration and Troubleshooting
- LAP 15 Analog Output Modules
- LAP 16 Analog Output Configuration and Troubleshooting

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

Allen - Bradley (cont.)

PLC ALLEN- BRADLEY PANELVIEW PLUS 7 APPLICATIONS - ZTEC 408

Average time for course completion: 15 hours

Investment: \$420

- 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: \$580

- 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 DEVICENET FOR CONTROLLOGIX - ZTEC 429

Average time for course completion: 15 hours

Investment: \$420

- 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: \$420

- LAP 1 Industrial Communications Networks
- LAP 2 Remote Input/Output
- LAP 3 Produced/Consumed Data and Messages

PLC ALLEN-BRADLEY COMPACTLOGIX - L16 ZTEC 454

Average time for course completion: 80 hours

Investment: \$2,230

- 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: \$580

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



Allen-Bradley



PLC

These courses have an open start date.

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

Siemens

SIEMENS

TIA PORTAL/57-1200 AVAILABLE. SEE PAGE 3

PLC SIEMENS S7-300 LEARNING SYSTEM WITH TROUBLESHOOTING - ZTEC 412

Average time for course completion: 80 hours

Investment: \$2,230

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

SIEMENS PLC ANALOG LEARNING S7-300 - ZTEC 413

Average time for course completion: 25 hours

Investment: \$580

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: \$405

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: \$420

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: \$175

LAP 1	Remote Input/Output
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Instrumentation and Process Control

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

LEVEL AND FLOW PROCESS CONTROL - ZTEC 416

Average time for course completion: 60 hours

Investment: \$1,570

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: \$1,570

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



These courses have an open start date.

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

INDIVIDUAL COURSES - UPGRADE YOUR SKILLS

Automation has crossed into all facets of modern manufacturing in an effort to produce items that are more accurately made and less costly to manufacture. The workforce required to support these industries, both now and in the future, will need to develop additional skills.



MOTION CONTROL (SERVO) LEARNING SYSTEM - ZTEC 520

Average time for course completion: 36 hours

Investment: \$1,270

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 Control

MOTION CONTROL (SERVO) LEARNING SYSTEM 2 - ZTEC 521

Average time for course completion: 24 hours

Investment: \$845

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
- LAP 2 Motion Control Camming
- LAP 3 Synchronized Motion

**** COMING SOON ****

UNIVERSAL ROBOTS UR3E

The UR3e is the ideal definition of a collaborative, industrial robot. Designed to optimize efficiency in confined workspaces, the UR3e offers unmatched flexibility and precision. While the cobot can be mounted on a table working side-by-side with employees, it can also be integrated within a separate workstation for solutions including picking, assembling, and placing parts.

These courses have an open start date.

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

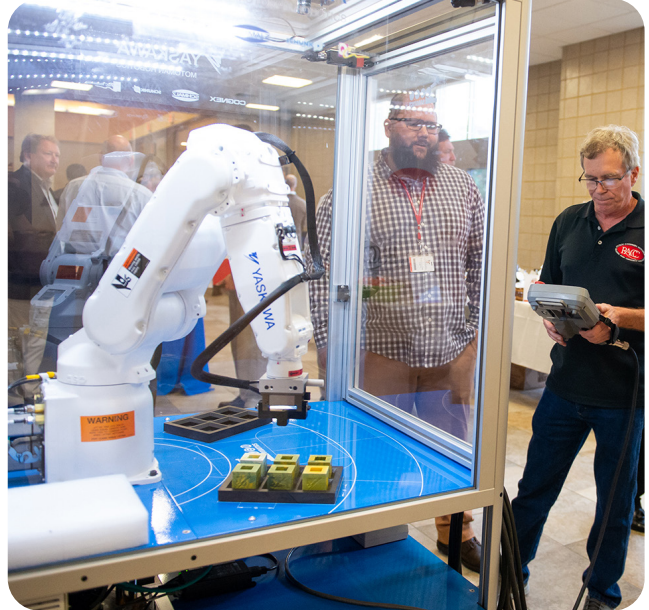
MOTOMAN MERIT CERTIFIED ROBOT FS100 BASIC PROGRAMMING WITH MATERIAL HANDLING

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 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



SUPERVISORS AND MANAGEMENT

INTRO TO MOTOMAN FS100 BASIC PROGRAMMING WITH MATERIAL HANDLING ZTEC 559

Average time for course completion: 8 Hours

Investment: \$415

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



These courses have an open start date.

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

CompTIA

**AVAILABLE
IN
SPANISH**



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.

**Aligns with 220-1001 & 220-1002
CompTIA A+ Certification exams**

IT ESSENTIALS - FUNDAMENTALS

ZCOM-336 \$1,815

Textbook additional fee.

Includes test fee.

Approximate time to complete: 200 hours

Instructor support during lab hours.

IT ESSENTIALS - ADVANCED

ZCOM-337 \$1,815

Includes test fee.

Prerequisite of ZCOM 336

(use book from ZCOM 336)

Approximate time to complete: 200 hours

Instructor support during lab hours.



SECURITY+

ZCOM-355

\$3,075

Includes test fee.

Approximate time to complete: 200 hours

Instructor support during lab hours.

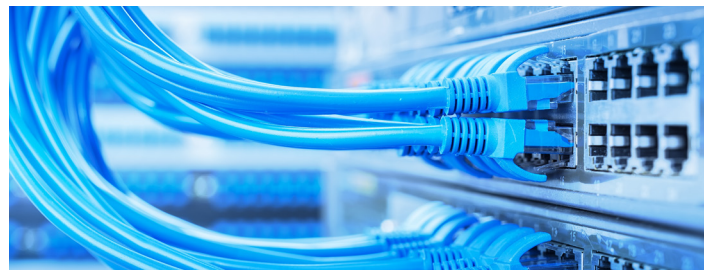


CCNA 7.0

Textbook additional fee.

Instructor support during lab hours.

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).



ENTERPRISE NETWORKING, SECURITY, AND AUTOMATION

ZCOM-416

\$1205 for Approx. 90 hours

Instructor support during lab hours.

(includes exam)

INTRO TO NETWORKS

ZCOM-413

\$875 for Approx. 90 hours

SWITCHING, ROUTING AND WIRELESS ESSENTIALS

ZCOM-414

\$875 for Approx. 90 hours

Instructor support during lab hours.

IIOT

ZCOM-419

\$1,405 for Approx. 90 hours

Instructor support during lab hours.

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.

These courses have an open start date.

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

OSHA COMPLIANT SAFETY TRAINING TAUGHT AT YOUR FACILITY OR ONLINE.

- OSHA 10 + 30 HOUR - GENERAL INDUSTRY
- LOCKOUT/TAGOUT
- MACHINE GUARDING
- FALL PROTECTION
- CONFINED SPACE
- FIRE EXTINGUISHERS
- INCIPIENT FIRE BRIGADE

Meet Our Instructors:

Scot L. Landis – Scot has spent 42 years in the Fire Service. He is a retired Deputy Fire Chief from the City of Reading with 20 years combined experience as a Line and Chief Fire Officer. Since 1990, Scot has been teaching Basic and Advanced Firefighting, OSHA 30 hour and SCBA training. He is a member of the National Professional Qualification Board and is a certified Confined Space and Trench Technical Rescuer.



Charles Zechman III - Chuck has a Bachelor of Science in Occupational Safety and Health with a concentration in Fire Science from Columbia Southern University. He spent 45 years working for a local manufacturing company. He was the Safety and Environmental Manager for 29 years and the Lean lead for five years. He spent 47 years as a firefighter (certified fire instructor) and 30 years as a Technician/Captain for the Berks County Hazmat team and is a certified Hazmat technician. He is an authorized OSHA instructor.



For more information contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312

CPR Training for your Workforce

CPR custom training options include:

- Training at organization sites day or evening
- Training on RACC Campus for organizations and individuals



New to the RACC's American Heart Association Training Center-
Basic Life Support Classes in Spanish.

Our Workforce Team delivers custom training solutions that meet your needs. Contact Auria Bradley at abradley@racc.edu or call 610.372.4721 Ext 5120



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WORKFORCE
PREPARED
FOR AN
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SPECIALIST
(CRS)**



**CERTIFIED
PEER
SPECIALIST
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anywhere,
anytime.



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can trust.



FLEXIBLE & SELF-PACED

Study on your
schedule.



STAY COMPLIANT. ADVANCE YOUR CAREER.

Keep your certification
current and continue
making a difference.



INVEST IN YOURSELF.
Continue Your Impact.

START YOUR TRAINING TODAY!

QUESTIONS? WE'RE HERE TO HELP!



**CONTACT
AURIA BRADLEY**

Associate VP of Workforce &
Continuing Education



abradley@racc.edu



610-372-4721 ext. 5120



racc.edu/workforce

REAL SKILLS. REAL IMPACT.

ESL & SPANISH IN THE WORKPLACE



**WEDNET
ELIGIBLE**



WORKFORCE
READING AREA COMMUNITY COLLEGE
SCHMIDT TRAINING & TECHNOLOGY CENTER

What our customers are saying:

"Reading Hospital Tower Health and the Reading Hospital Foundation are proud to partner with RACC's Workforce and Continuing Education Team to bring Spanish as a Second Language classes to our staff. Effective communication is crucial for providing an exceptional patient experience. The RACC classes offer employees the tools to increase engagement with Spanish-speaking patients and improve satisfaction. We look forward to our continued partnership and shared commitment to the community."

*Desha Dickson, MS CDE
VP of Community Wellness*

ESL for the Workplace

Time: 10 – 20 Weeks

CUSTOMIZED training at your facility

- Three levels of training offered:
 - Beginner
 - Intermediate
 - Advanced
- Training is designed to build the English language and conversational skills of employees.
- Training can be customized to meet company needs which can include specific workplace scenarios.

Spanish for the Workplace

Time: 4 Weeks

- Three modules of training offered.
- The training focuses on Basic Spanish language and communication skills for the workplace.
- Training customized to meet the needs of real-life workplace scenarios and processes
 - » Basic workplace conversations, job expectations and performance discussions, safety and emergency dialogs. These sessions also include an introduction to the Hispanic Culture.

CUSTOMIZED TRAINING FOR YOUR TEAM AT YOUR FACILITY

For more information contact Auria Bradley, Associate Vice President, Workforce and Continuing Education at abradley@racc.edu or call 610.372.4721 Ext. 5120

Taking the Lead: Skillbuilding for Supervisors and Team Leads

Time: 7 Hrs.

Managers manage tasks – Leaders lead people. Highly effective leaders and team leads know themselves, their teams and their work and utilize this knowledge to consistently achieve results. The “Taking the Lead” program provides experiences, skills and tools to enhance both the mindsets and skillsets of leaders and positions.

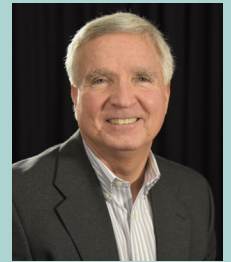
Who is this course for?

This 7-hour workshop is designed for supervisors and team leads, specifically those in roles who would like to enhance both their leadership mindsets and skillsets. Participants who attend this training will receive a RACC Workforce certificate upon completion of the class.

Meet Our Instructor:

Jack Tongue is a learning & development leader with over 30 years’ experience in the creation, development and delivery of training solutions. Jack’s primary areas of focus are leadership, sales and operations. He has facilitated leadership, sales, customer service, coaching, presentation, business writing, communication, and performance management programs.

Jack holds a Masters Degree in Instructional Systems Design from The Pennsylvania State University and a BS in Education from Millersville University. He served as an officer in the United States Marine Corps and was globally deployed.



CUSTOMIZED TRAINING FOR YOUR TEAM AT YOUR FACILITY

For a customized training at your facility contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312

Energy Leadership Training: The Energetic and Influential Leader

Time: 12 Hrs. (four, 3-hour sessions)

Assess yourself with the Energy Leadership Index (ELI), a one-of-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.

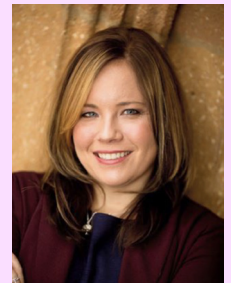
Who is this course for?

This 20-hour workshop is designed for middle management to executive teams. The ideal attendee is any person who has direct reports and wants to develop a whole person approach to leadership. Attendees will walk away with self-awareness, leadership best practices and a toolbox of tools to utilize in various leadership situations. Participants who attend this training will receive a RACC Workforce certificate upon completion of class.

Meet Our Instructor:

Laural Miller is a dynamic leader, trainer, facilitator, and coach. She has 20 years of leadership experience in the Greater Reading Area’s business and non-profit sectors.

She holds a Master’s Degree in Business Administration and is a proud graduate of RACC and Alvernia University. Laural is also a Professional Certified Coach (PCC) credentialed through the International Coaching Federation. She holds her Executive Wellness Coach certification.



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The Highly Productive Leader

Time: 12 Hours (three, 4-hour sessions)

This workshop follows a process that develops an effective style of leadership that positively influences and changes those you work and interact with, yourself, and your entire organization.

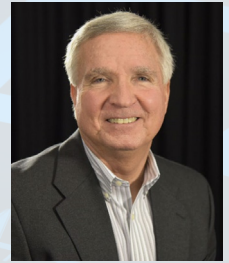
Key focus areas include:

- 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

Meet Our Instructor:

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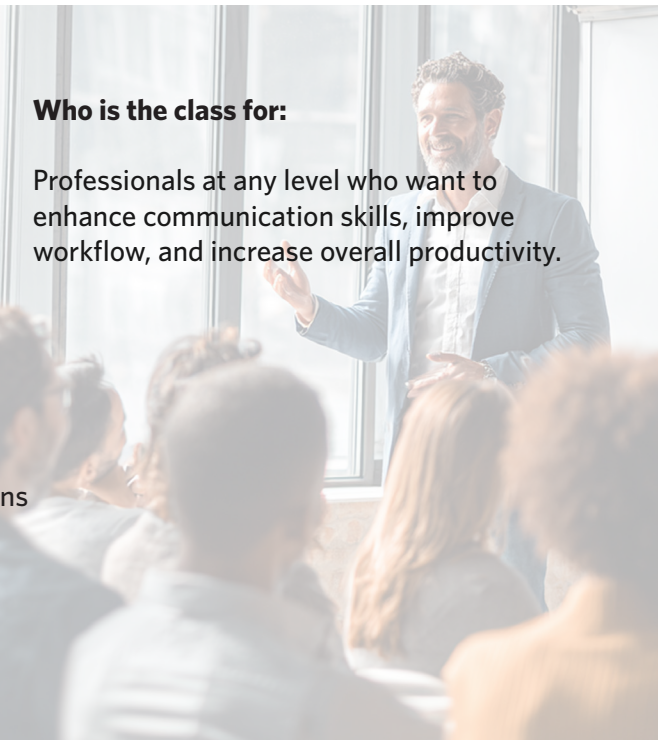
Business Communication

Key Topics

- Recognizing the Impact of Communication on Results
- Identifying & Managing Your Communication Style
- Adjusting Messaging to the Audience
- Communicating Verbally
- Enhancing Active Listening Skills
- Creating Effective Written Communication
- Managing Email and Other Communication
- Aligning Messaging to Team & Individual Goals
- Group and Individual Messaging Strategies
- Dealing with Difficult Verbal & Written Communication Situations
- Integrating AI into Communication Activities
- Establishing Yourself as an Effective Communicator

Who is the class for:

Professionals at any level who want to enhance communication skills, improve workflow, and increase overall productivity.



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Delivering Superior Customer Service

Time: 7 Hours

Highly functioning Customer Service teams are viewed by their customers as partners, not simply suppliers. The ability to effectively represent your company to the customer and the customer to your company is a competitive differentiator that requires skilled and aligned customer service team members. This workshop provides all customer facing personnel with skills, best practices and tools to enable them to deliver service excellence by managing customer expectations and building customer relationships.



For a customized training at your facility contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312

The Rooted Workplace System™

Flexible Learning Options

- Speaking Engagements
- Workshops & Team Training
- Workplace Integration & Leadership Coaching
- Individual & Small Group Coaching

The Rooted Workplace System™ is a science-backed approach to workplace wellness that helps organizations reduce burnout, improve communication, and build resilient, high-performing teams.

By combining stress assessment, behavioral insights, and nervous system regulation tools, this program addresses the root causes of workplace stress—creating lasting change in both individuals and organizational culture.

Organizations can expect:

- Reduced burnout and absenteeism
- Improved communication and collaboration
- Stronger leadership presence
- Increased employee engagement
- More sustainable performance

Includes:

- Stress awareness & burnout prevention (SMQ-informed)
- Communication & team dynamics (DISC-based insights) ▪
- Nervous system regulation (Polyvagal + HeartMath tools)
- Leadership development (Energy Leadership + One on One coaching)
- Practical, real-time tools for stress and performance

For a customized training at your facility contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312



Train the Trainer

Time: 7 Hours

Being a subject matter expert does not necessarily imply the capability to train others. The ability to effectively “train others to train” is a force multiplier for any business and requires the knowledge and skills to both develop and deliver effective and meaningful instruction. This workshop provides subject matter experts with the tools, skills and best practices to develop other trainers in an adult learning environment and expand their organization’s training capacity.

**SIGN UP
TODAY!**



CUSTOMIZED TRAINING FOR YOUR TEAM AT YOUR FACILITY

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One-on-One Performance Coaching

Customized training at your facility

Performance coaching can help identify an employee’s growth, as well as help plan and develop new skills. Our Certified Coaches meet one on one with employees for:

- Behavior Change Wellness & Stress Management
- Leadership Development
- Succession planning
- Performance Improvement Plans (PIPs)
- Culture Development and much more

"My experience with Laural Miller was professional and collaborative. Executive Wellness Coaching focused on my personal growth, which was necessary before focusing on professional goals. We worked together to set goals and develop the steps needed to reach them."

Kelly, GK - Elite Sportswear

For more information contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312

MANAGEMENT MASTERCLASS

MANAGEMENT MASTERCLASS

Time: 28 Hours, Price: \$1,595

Tuesdays, October 6 - November 17

(seven, 4-hour sessions)

8AM - 12PM

Location: Schmidt Training & Technology Center

WHO SHOULD TAKE THIS COURSE:

This course is specifically designed for new, current, and upcoming Managers, Directors, and Executives.

PROGRAM HIGHLIGHTS:

Leadership

- Integrity Solutions Assessment included
- Identifying & Managing Behavior Styles
- Communicating Consistently & Effectively
- Building & Leading Engaged Teams
- Resolving Individual and Team Conflict

Organizational Strategy

- Harnessing Performance Management for Team Success
- Achieving Results Through Leadership
- Managing Talent Development
- Navigating Obstacles to Individual & Team Success

Financial

- Monthly financial analysis of operations processes & procedures
- Cost analysis and cost management procedures
- Forecasting and Pro Forma Projection processes
- Operations Budget Development procedures
- Capital Expenditure and Business Investment analysis and proposal procedures

**SIGN UP
HERE**



85% of new managers receive no formal training and are promoted into management positions because they were good in their individual contributor roles.

Meet our Instructors:



Lawrence Franz is a seasoned executive advisor and entrepreneur with over 30 years of experience in corporate operations, financial strategy, and business transformation. He has successfully founded, scaled, and exited multiple ventures, and currently leads an asset liquidation firm with over 1,000 auctions completed. As a trusted advisor with Marathon Business

Advisory Services, he consults on business valuations, due diligence, risk management, and financial forensics for companies navigating complex transitions.

A dynamic presenter and former adjunct faculty at top institutions, Lawrence Franz blends real-world insight with academic rigor. He holds an MBA in Finance and Management (Summa Cum Laude), a B.S. in Physical Therapy (Magna Cum Laude), and professional licenses in both healthcare and auctioneering.



Jack Tongue is a learning & development leader with over 30 years' experience in the creation, development and delivery of training solutions. Jack's primary areas of focus are leadership, sales and operations. He has facilitated leadership, sales, customer service, coaching, presentation, business writing, communication, and performance management programs.

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WORKFORCE
READING AREA COMMUNITY COLLEGE

For more information contact Pandora Mazzo at pmazzo@racc.edu or call 610.372.4721 Ext. 5312

Lean Six Sigma at Your Facility

Cost per person:

White Belt, 32 Hours - \$1,995/per person

Yellow Belt, 40 Hours - \$3,225/per person

Green Belt, 80 Hours - \$4,345/per person

Black Belt, 120 Hours - \$5,995/per person

Customized training at **your facility**



Our Lean Six Sigma solves real problems in real time—right at your facility.

This program includes up to 120 hours of experienced, in-person, and interactive training.

Change and continuous improvement are ongoing processes. They start with equipping your team with the skills, tools, and techniques needed to lead projects and actively contribute to meaningful improvement efforts.

Our Lean Six Sigma Belt classes provide the knowledge and hands-on experience required to become an effective leader in Lean and continuous improvement. Choose a full Belt certification or customize your training by selecting from any of our fifteen breakout sessions. p Belt Certification or have a breakout session by select any of our fifteen sessions.

Belts			Workshops	
				Introduction to Lean Principles, Strategies & Techniques (8 Wastes)
				Kaizen Events (Plan, Conduct & Follow-up)
				6S Workplace Organization Kaizen
				Lean Daily Management (SQDC)
				Root Cause & Corrective Action (8D)
				Six Sigma - DMAIC (Define–Measure–Analyze–Improve–Control)
				Kanban Pull Systems (PFEP)
				Continuous Flow (Cellular Layouts)
				Quick Changeover (SMED)
				Total Preventive Maintenance (TPM)
				Lean Leader / Facilitator / Coach (LFC)
				The Eight Steps of Value Stream Management (VSM)
				Six Sigma - Statistical Process Control (SPC)
				Creating a Continuous Improvement Culture (Kata)
				Policy Deployment / Hoshin

For more information contact Pandora Mazzo at
pmazzo@racc.edu or call 610.372.4721 Ext. 5312

LEAN SIX SIGMA *BLACK BELT* BOOT CAMP

Yellow to Black | Wednesdays
April 7 - June 2



Dan Roth is President of Go-Lean-Six Consulting LLC, a Lean Six Sigma consulting and training firm. Dan started as a Go-Lean-Six Consultant and progressed to a Lean-Six Black Belt, Director of Operational Excellence, Lean-Six Master Blackbelt and now the

President / CEO of Go-Lean-Six Consulting. Dan brings over 22 years' experience in leadership, teaching, training, coaching, and mentoring in manufacturing.



Bill Law started his career in the Automotive sector and turned to the Lean Six ideology while in this field. Bill has extensive experience in both training and applying the tools in a variety of industries and environments across all levels of an organization.

These industries include glass manufacturing, contract liquid manufacturing, metal fabrication,

"The class provides an abundance of techniques that can be used in my workplace for further improvement to the workflow. Dan Roth is well-versed in the teachings and made it an engaging experience through examples in my workplace."

Xavier Zavala
Manufacturing Engineer, Brentwood Industries

For more information contact Pandora Mazzo at
pmazzo@racc.edu or call 610.372.4721 Ext. 5312

CHOOSE A CAREER THAT MAKES A POSITIVE ENVIRONMENTAL IMPACT



WASTEWATER TREATMENT PLANT OPERATOR CERTIFICATION PROGRAM

WHAT'S YOUR GOAL?

If your goal is a career in a field that makes a *POSITIVE ENVIRONMENTAL IMPACT*, is stable, and has growth potential, then RACC's Wastewater Treatment Plant Operator Program will get you on the right path.

WE HELP YOU GET THERE WITH . . .

- Instructors who are certified operators and/or subject matter experts
- Class size of 30 students or fewer
- Engaging classroom experiences
- Field trips to better understand treatment processes discussed in class

PROGRAM DESCRIPTION

Reading Area Community College offers a 180-hour certification program designed to prepare new operators for licensing in the high-demand field of wastewater treatment plant operators. The curriculum for the program was developed by the Pennsylvania Department of Environmental Protection (DEP). This program will prepare students for the DEP's operator certification exams. Combining this program with work at a local treatment facility will prepare students for licensing.

WHAT YOU WILL LEARN

The Wastewater Treatment Operator program combines course work, on-site visits to facilities with classroom components, interactive class discussion with current certified operators, out-of-class assignments, and module-end exams. The program utilizes DEP-approved curriculum that is taught by certified operators and other qualified instructors. The course components also offer continuing education units (contact hours) necessary for certified operators to maintain their certifications.

ADMISSION REQUIREMENTS

- Graduate of an approved secondary school or hold a high school equivalency diploma (GED)
- Commitment to attendance policies and program requirements

CLASS INFO

Tues. & Thu. 6 PM - 9 PM

August, 2025 - 90 Hour Fall Program, \$1,495

January, 2026 - 90 Hour Spring Program, \$1,495

WANT TO LEARN MORE?

Contact David Lerch at dlersch@racc.edu or call 610-372-4721 ext. 6208

Ten South Second Street, Reading, PA 19602 | 610.607.6224 | 800.626.1665 | www.racc.edu

FUNDAMENTALS OF PROJECT MANAGEMENT

Instructor Daral Woerle
\$825

The Project Management course offers a fundamental look into the key best practices of project management. We deliver the course over four sessions with in-class and out-of-class activities. Participants learn how to plan a project, then lead the project to a successful delivery. Whether you are new to project management or have some experience, everyone will leave with new insights, tools, and techniques to implement immediately.

Who this course is for:

This 16-hour course is designed for managers and supervisors involved in engineering, research and development, data processing, manufacturing, corporate planning, finance and marketing.

**Meet Our Instructor:**

Daral A. Woerle, Esquire, PMP was born and raised in Berks County. He served on active duty in the United States Army for eight years before obtaining a law degree. He has been providing leadership and consulting services for over 35 years. Currently, Daral serves as

the president of PinnaclePM, LLC, a management consulting company focusing on providing project management, process improvement, and training services.

Daral has earned both the Project Management Institute's (PMI) Project Management Professional (PMP) and Prince2 Practitioner certifications and is a designated PMP prep course instructor. He has taught Project Management courses to thousands of students including Fortune 100 Companies like Facebook, Subaru, and the United Nations.

For more information contact Pandora Mazzo at
pmazzo@racc.edu or call 610.372.4721 Ext. 5312



Reading Area Community College
Community Education
10 South Second Street
P.O. Box 1706
Reading, PA 19603-1706

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Schmidt Training and Technology Center

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SKILLS WITH CERTIFICATE →

SKILLS WITH DEGREE

Celebrating 20 years!

