Advanced Manufacturing Technology

The Importance of Industry Apprenticeships
In Technical Education
Ranken Technical College

- St. Louis, MO (1907)
- Private
- Nonprofit
- Primary Mission
  - “... comprehensive education and training necessary to prepare students for employment and advancement in a variety of technical fields”.

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Ranken Technical College

• Three Educational Components
  – Technical Education
  – General Education
  – Work Ethic
Ranken Technical College

• HLC Accreditation
  – Certificate of Technology
  – Associate of Technology
  – Associate of Science
  – Bachelor of Science
Ranken Technical College

- St. Louis, Missouri Campus (1907)
- Wentzville, Missouri Site (2013)
  - Advanced Manufacturing Technology
Advanced Manufacturing Technology

• Associate of Technology
  – 52 Credit Hours Advanced Manufacturing
    • 28 Credit Hours Instruction and Training
    • 24 Credit Hours Internship (Internal/External)
  – 27 Credit Hours General Education

• DOL Registered Apprenticeship
  – Five Required Components
Advanced Manufacturing Technology

What are the Components of Registered Apprenticeship?

**Employer Involvement**
Employers are the foundation of every Registered Apprenticeship program.

**Structured On-the-Job Training**
Apprentices receive on-the-job training from an experienced mentor for typically not less than one year.

**Related Training and Instruction**
Apprenticeships combine on-the-job learning with technical education at community colleges, technical schools, or apprenticeship training schools – or provided on-line or at the job site.

**Rewards for Skill Gains**
Apprentices receive increases in wages as they gain higher level skills.

**National Occupational Credential**
Registered Apprenticeship programs result in a nationally-recognized credential – a 100% guarantee to employers that apprentices are fully qualified for the job.
DOL - Employer Involvement

- Hunter Engineering
- Tech Manufacturing
- Hoemeyer Precision Machining
- Component Bar Products
- Seyer Industries
- Patterson Tool & Mold
- Designs for Tomorrow Inc.
DOL - Structured On-the-Job Training

- 4 Semesters
- 8 Weeks Paid Internship Each Semester
  - External (Off-Campus Job Site)
  - Internal (On-Campus Microenterprise)
- 32 Weeks Total Paid Internship
- 20 Hour Work Week Minimum
DOL - Related Training and Instruction

- 4 Semesters
- 8 Weeks Classroom Theory and Shop Each Semester
- 32 Weeks Total Related Training and Instruction
- 20 Hours Training and Instruction each Week
DOL – Rewards for Skill Gains

• Faculty On-Site Evaluations of Students with Employer Every 4 Weeks
• Incremental Pay Increases Based on Evaluations
DOL – National Occupational Credential

- DOL Registered Apprenticeship Program
- Nationally Recognized Credential
- Ensures Students are Fully Qualified
- 100% of First Graduating Class Received Job Offers Before Completing the Program (22 students)
Advanced Manufacturing Technology

- Associate of Technology
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Program Outcomes for Advanced Manufacturing Technology
Program Outcomes

• Interpret blueprints to determine and prioritize procedures for part manufacturing using lean manufacturing processes.
• Operate various manual and computer numerical control (CNC) machines and use measuring equipment.
Program Outcomes

• Analyze, record, and report the machining process and inspection results using various types of statistical process controls (SPC) with a focus on quality.
• Apply skills and procedures learned in theory and shop into modern manufacturing facilities with emphasis on Student Work Habits and Work Ability.
Semester 1 - CNC Operator

- Safety and Work Ethic
- Machine Shop Math
- Blueprint Reading (GD&T)
- Set-Ups on Manual and CNC Machines
- Total Productive Maintenance (TPM)
Semester 1 – CNC Operator

• CNC Operator Theory & Shop
  – 8 Weeks Instruction & Training
  – 8 Weeks Internship
Semester 2 - Quality

• Inspection Procedures
• QC & Modern Inspection Equipment
• 3-D Master Gauge
• Cutting Tool Methods & Consistent Quality
• Lean Manufacturing – Green Level Six Sigma
Semester 2 - Quality

• Quality Theory & Shop
  – 8 Weeks Instruction & Training
  – 8 Weeks Internship
Semester 2 - Quality
Semester 3 - Manufacturing

• Lean Manufacturing - Brown Level Six Sigma
• G-Code and Mazatrol
• Manufacturing Processes – Work Flow with Teams
• Cutting Tool Methods & Cycle Time Efficiency
Semester 3 - Manufacturing

- Manufacturing Theory & Shop
  - 8 Weeks Instruction & Training
  - 8 Weeks Internship
Semester 4 – Advanced Manufacturing

- Machine Tool Programming - MasterCam
- 3D Part Drawings - SolidWorks
- NIMS Certification
Semester 4 – Advanced Manufacturing

• Advanced Manufacturing Theory & Shop
  – 8 Weeks Instruction & Training
  – 8 Weeks Internship
Building an Education & Industry Alliance

• Industrial Advisory Committees
  – Local Company Leaders and Ranken Faculty
    • 16 Active Committees – 160+ Companies
  – Bi-Annual Meetings
  – Review Curriculum, Facilities, Equipment, and Work-Based Learning Opportunities
Building an Education & Industry Alliance

• Industrial Advisory Committees
  – Identified Industry Need for Advanced Manufacturing Apprenticeship Program
  – Participated in Curriculum Development
  – Donated 1 Million+ Dollars Towards Equipment and Supplies
Building an Education & Industry Alliance

• Industry Sponsored Microenterprises
• Industry Sponsored Pipeline Activities
Microenterprises

• Unique Education & Industry Partnerships Starting in 2010
• Internal On-Campus “Work Cells”
• Students Manufacture Products or Provide Services
Microenterprises

• Important Component of Advanced Manufacturing Apprenticeship Program
• Internal or In-House Internship On Campus
• Allows Ranken to Guarantee the Paid Internship to All Students
Microenterprises

• Hunter Engineering (Machining)
• bioMerieux
• Emerson Electric
• Retro & Rods Automotive Restorations
• GWR Safety Systems
• JEMA Studio Architects
• JM&A Call Center
• Enterprise Fleet Management Call Center
Microenterprises

- 250+ Students Since Inception
- Paid Internships
- 20 Hours per Week
- Evaluations - WFD Credit
- $400,000+ Products/Services Annually
Microenterprises

• Gain Valuable and Varied Technical Experience (not pigeon-holed)
• Learn Valuable “Soft Skills”
  – Interactions with Industry
  – Computer Skills
• Develop Work Ethic Behaviors Necessary for Employment
Microenterprises

• Develop a Sense of Urgency to meet “Live” Production Schedules
• Develop a Team Approach to Producing All “A+” Work
Microenterprises

• Recipient – 2015 Hunter Engineering Supplier of Excellence Award
• 374 Suppliers (Worldwide)
• Top 11 Receive Award
• Superior Quality, Delivery, and Service Performance
Microenterprises

- Retro & Rods Automotive Restoration
  1968 Corvette
Pipeline Activities

- Industry Sponsored
- Middle and High School Students
- Career Exploration
- STEM Activities
Pipeline Activities

- Skills USA
- FIRST Robotics Teams
  - 15 FIRST Lego League
  - 5 FIRST Tech Challenge
  - 3 FIRST Robotics
- Summer Academies
- SuperMileage Challenge
Pipeline Activities

- Skills USA
Pipeline Activities

- FIRST Robotics
Pipeline Activities

- 2016 Summer Academies
  - 300 Students
  - 22 Camps
  - 81 Zip Codes
  - 140 Public, Private & Home Schools
  - 68% Male, 32% Female
  - 7th Year of Growth
Pipeline Activities

• Summer Academies
Pipeline Activities

• SuperMileage Challenge
Summary

• The Best Way to Learn to How to Work is to Start Working
• The Best Way to Start Working is to Start Working with Industry
Summary

• Win-Win-Win for Education-Industry-Students
Are you material?

RANKEN
TECHNICAL COLLEGE material?