Data Driving Decision Making

Gardner Carrick, The Manufacturing Institute
Audrey Theis, Key Links Inc.
Chris Chmura, Chmura Economics & Analytics
Webinar Logistics

- Please mute your phone line. If you are unable to manually mute your line press *6 and your line will be muted.

- If you have a question, you can raise or lower your hand by clicking the Raise Hand icon and selecting Raise Hand from the drop down menu at the top of your screen.

- Please change your information to your full name and state by clicking on the Attendee List drop down and selecting ‘Edit My Info’.

- All questions will be addressed following the presentation.

- We would like to remind everyone that this call is being recorded and will be available on The Manufacturing Institute website shortly following the webinar.
Agenda

- Welcome and Purpose of Webinar
- Overview and Purpose of “Business Case” tool being prepared for each Skills Certification state
- Review of State Level Economic Data Package
- Using the Data to Drive Critical Decision Making in Support of Skills Certification Implementation
- Introduction of Chmura Economics and Analytics
- Q&A
Critical Components Driving Success

1. **Identify State/Regional Economic Demands (Data Validation)**
2. Develop Advanced Manufacturing Career Pathways
3. Develop a Timeline for Action
4. Engage Industry Leaders/Building Demand
5. Engage Faculty and College Leadership
6. Audit Programs of Study
7. Align and Map Certifications to Programs
8. Align to STEM; Emphasize/Integrate STEM Skills
9. Assess Faculty and Implement Professional Development
10. Develop Certification Partnerships
11. Deploy Dream It. Do It. (Student Recruitment)
12. Develop Feeder Systems (WIA, Adult Basic Education)
13. Develop Benchmarks
14. Drive a Policy Agenda
15. Sustain the Certification System (Administrative, Staffing & Fiscal Realities)
"Business Case” Power Point Presentation

- Customized deck of power point slides being prepared for each Skills Certification state
- Presents data and information so leadership in the state/region can better understand the current reality and future opportunity regarding manufacturing
- Intended as a tool to support implementation of the Skills Certification System:
  - Communication with various leadership groups
  - Data-driven decision making
  - Systemic, collaborative planning
Components of Business Case

Each State-Level Power Point Presentation will have four parts:

- Part One: Rationale for a Skills Certification System
- Part Two: Economic Data on Advanced Manufacturing and High Tech Manufacturing
- Part Three: An Overview of the NAM-Endorsed Skills Certification System
- Part Four: Maximizing Flexibility/Creating Opportunity
Rationale for Skills Certification System
Rationale for Skills Certification System

- Slides in this section will include:
  - The Big Picture
  - What Industry Leaders Say
  - The Business Case
  - Tenets of the NAM-Endorsed Skills Certification System
Economic Data
Data Elements

Economic Data Analysis includes:

- Current state of manufacturing
- Largest projected worker demand
- Projected high-demand occupations
- Implications for worker skill levels
- Advanced manufacturing and high-tech manufacturing
Definition: Advanced Manufacturing

- Advanced Manufacturing = NAICS Codes 31-33
- Low-skill manufacturing jobs are disappearing
- Remaining jobs require higher skill levels
- Skills include critical STEM disciples such as math, applied technology and statistics for quality control
- Sample “traditional” industries: Primary Metal, Fabricated Metal Product, Food, Machinery, Computer and Electronic Products, Transportation Equipment, Apparel, Chemical, Furniture, etc.
Definition: High-Tech Manufacturing

- Operationally defined by DOL: high-tech industries employ at least 2X the average high-tech occupations when compared to all industries in the nation.
- Many high-tech industries use the same occupations as manufacturing and many are support industries to manufacturing.
- Sample “high-tech” industries: Semiconductor and other Electronic Components; Aerospace Products and Parts; Audio and Video Equipment; Navigation, Measuring, Electro-medical and Control Instruments.
Prototype Data
A Sample State
Advanced Manufacturing is a Major Economic Driver in the State

- 8,867 companies
- 450,925 workers (17% of all jobs)
- Average wage of $54,635
- Advanced manufacturing jobs are good, family-wage jobs

Source: Chmura Economic & Analytics’ JobsEQ.
Advanced Manufacturing is the 3rd Largest Employer in the State

Source: Chmura Economic & Analytics’ JobsEQ.
Advanced Manufacturing Supports 35% of all Jobs

Source: Chmura Economic & Analytics’ JobsEQ.
Manufacturing Supports 54% of Total Regional Output or about $201 Billion

Source: Chmura Economic & Analytics’ JobsEQ.
## Advanced Manufacturing
### Largest Projected Worker Demand

<table>
<thead>
<tr>
<th>NAICS</th>
<th>Industry</th>
<th>Employment 2011 Q1</th>
<th>Average Annual Wages</th>
<th>10 Year Worker Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>3363</td>
<td>Motor Vehicle Parts Manufacturing</td>
<td>45,643</td>
<td>$53,817</td>
<td>9,438</td>
</tr>
<tr>
<td>3391</td>
<td>Medical Equipment and Supplies Manufacturing</td>
<td>19,946</td>
<td>$62,466</td>
<td>6,571</td>
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<tr>
<td>3261</td>
<td>Plastics Product Manufacturing</td>
<td>28,472</td>
<td>$41,591</td>
<td>5,829</td>
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<tr>
<td>3362</td>
<td>Motor Vehicle Body and Trailer Manufacturing</td>
<td>25,386</td>
<td>$51,804</td>
<td>5,795</td>
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<tr>
<td>3254</td>
<td>Pharmaceutical and Medicine Manufacturing</td>
<td>16,855</td>
<td>$120,376</td>
<td>4,043</td>
</tr>
<tr>
<td>3399</td>
<td>Other Miscellaneous Manufacturing</td>
<td>9,333</td>
<td>$40,804</td>
<td>3,925</td>
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<tr>
<td>3311</td>
<td>Iron and Steel Mills and Ferroalloy Manufacturing</td>
<td>18,127</td>
<td>$80,030</td>
<td>3,767</td>
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<tr>
<td>3371</td>
<td>Household and Institutional Furniture and Kitchen Cabinet Manufacturing</td>
<td>12,385</td>
<td>$36,782</td>
<td>3,345</td>
</tr>
</tbody>
</table>

Source: Chmura Economic & Analytics’ JobsEQ.
# High-Tech Manufacturing

## Largest Projected Worker Demand

<table>
<thead>
<tr>
<th>NAICS</th>
<th>Industry</th>
<th>Employment 2011 Q1</th>
<th>Average Annual Wages</th>
<th>10 Year Worker Demand</th>
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<tr>
<td>5416</td>
<td>Management, Scientific, and Technical Consulting Services</td>
<td>10,825</td>
<td>$43,020</td>
<td>10,856</td>
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<td>5415</td>
<td>Computer Systems Design and Related Services</td>
<td>16,993</td>
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<td>5413</td>
<td>Architectural, Engineering, and Related Services</td>
<td>18,755</td>
<td>$42,743</td>
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<td>5511</td>
<td>Management of Companies and Enterprises</td>
<td>26,878</td>
<td>$75,372</td>
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<td>5191</td>
<td>Other Information Services</td>
<td>7,412</td>
<td>$16,570</td>
<td>4,827</td>
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<td>3254</td>
<td>Pharmaceutical and Medicine Manufacturing</td>
<td>16,855</td>
<td>$120,376</td>
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<td>9281</td>
<td>National Security and International Affairs</td>
<td>9,714</td>
<td>$71,596</td>
<td>3,012</td>
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<td>4234</td>
<td>Professional and Commercial Equipment and Supplies Merchant Wholesalers</td>
<td>12,156</td>
<td>$53,300</td>
<td>2,731</td>
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</tbody>
</table>
## Projected High Demand Occupations within Advanced Manufacturing

<table>
<thead>
<tr>
<th>SOC</th>
<th>Title</th>
<th>Employment 2011 Q1</th>
<th>Average Annual Wages</th>
<th>10 Year Worker Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-2092</td>
<td>Team Assemblers</td>
<td>37,127</td>
<td>$31,650</td>
<td>8,326</td>
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<tr>
<td>53-7062</td>
<td>Laborers and Freight, Stock, and Material Movers, Hand</td>
<td>10,103</td>
<td>$24,630</td>
<td>3,240</td>
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<tr>
<td>51-4121</td>
<td>Welders, Cutters, Solderers, and Brazers</td>
<td>10,322</td>
<td>$34,290</td>
<td>3,154</td>
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<tr>
<td>43-4051</td>
<td>Customer Service Representatives</td>
<td>5,210</td>
<td>$30,780</td>
<td>2,407</td>
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<tr>
<td>53-7051</td>
<td>Industrial Truck and Tractor Operators</td>
<td>7,820</td>
<td>$32,080</td>
<td>2,317</td>
</tr>
<tr>
<td>51-1011</td>
<td>First-Line Supervisors/Managers of Production and Operating Workers</td>
<td>16,535</td>
<td>$53,460</td>
<td>2,223</td>
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<tr>
<td>51-2099</td>
<td>Assemblers and Fabricators, All Other</td>
<td>9,718</td>
<td>$36,810</td>
<td>2,178</td>
</tr>
<tr>
<td>41-4012</td>
<td>Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products</td>
<td>7,549</td>
<td>$58,220</td>
<td>1,959</td>
</tr>
<tr>
<td>49-9042</td>
<td>Maintenance and Repair Workers, General</td>
<td>9,855</td>
<td>$37,430</td>
<td>1,893</td>
</tr>
<tr>
<td>51-9061</td>
<td>Inspectors, Testers, Sorters, Samplers, and Weighers</td>
<td>11,336</td>
<td>$33,510</td>
<td>1,891</td>
</tr>
</tbody>
</table>

Source: Chmura Economic & Analytics’ JobsEQ.
## Projected High Demand Occupations within High-Tech Manufacturing

<table>
<thead>
<tr>
<th>SOC</th>
<th>Title</th>
<th>Employment 2011 Q1</th>
<th>Average Annual Wages</th>
<th>10 Year Worker Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-1031</td>
<td>Computer Software Engineers, Applications</td>
<td>3,361</td>
<td>$71,800</td>
<td>1,292</td>
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<tr>
<td>43-4051</td>
<td>Customer Service Representatives</td>
<td>2,371</td>
<td>$30,800</td>
<td>1,095</td>
</tr>
<tr>
<td>51-2092</td>
<td>Team Assemblers</td>
<td>4,413</td>
<td>$31,600</td>
<td>990</td>
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<tr>
<td>15-1032</td>
<td>Computer Software Engineers, Systems Software</td>
<td>2,686</td>
<td>$77,400</td>
<td>977</td>
</tr>
<tr>
<td>13-1111</td>
<td>Management Analysts</td>
<td>2,905</td>
<td>$72,000</td>
<td>971</td>
</tr>
<tr>
<td>15-1051</td>
<td>Computer Systems Analysts</td>
<td>2,568</td>
<td>$68,100</td>
<td>924</td>
</tr>
<tr>
<td>17-2051</td>
<td>Civil Engineers</td>
<td>2,119</td>
<td>$68,500</td>
<td>806</td>
</tr>
<tr>
<td>11-1021</td>
<td>General and Operations Managers</td>
<td>2,789</td>
<td>$104,400</td>
<td>806</td>
</tr>
<tr>
<td>15-1041</td>
<td>Computer Support Specialists</td>
<td>1,917</td>
<td>$41,000</td>
<td>725</td>
</tr>
<tr>
<td>13-1199</td>
<td>Business Operations Specialists, All Other</td>
<td>2,211</td>
<td>$60,000</td>
<td>657</td>
</tr>
<tr>
<td>17-2141</td>
<td>Mechanical Engineers</td>
<td>2,361</td>
<td>$69,000</td>
<td>604</td>
</tr>
<tr>
<td>17-2112</td>
<td>Industrial Engineers</td>
<td>1,876</td>
<td>$69,400</td>
<td>587</td>
</tr>
</tbody>
</table>
Manufacturing Jobs Require Higher Skills

Manufacturing Employment by Skill Group, 2003 through 2010

Overview of the NAM-Endorsed Skills Certification System
Overview of the Skills Certification System

- Slides in the section will include:
  - Background information on skills certification system
  - “Wheel” visual showing four tiers of common foundation skills supporting fifteen advanced and high-tech manufacturing industries
  - Outline of core workplace skills, applied academic/personal management skills and cross-cutting technical skills
  - Skills pyramid and overlay of five certifications (NCRC, MSSC, AWS, NIMS, and SME)
  - Alignment of education pathways, occupational pathways and certification pathways
Maximizing Flexibility/
Creating Opportunity
<table>
<thead>
<tr>
<th>Core Workplace Skills</th>
<th>Applied Academics/Personal Management</th>
<th>Cross Cutting Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation/ Creativity</td>
<td>Applied math</td>
<td>Process Design and Development</td>
</tr>
<tr>
<td>Critical Thinking/Problem Solving</td>
<td>Reading for Information and Locating Information</td>
<td>Production</td>
</tr>
<tr>
<td>Communications</td>
<td>Applied Science</td>
<td>Maintenance, Installation and Repair</td>
</tr>
<tr>
<td>Information Technology Application</td>
<td>Ability to learn</td>
<td>Supply Chain Logistics</td>
</tr>
<tr>
<td>Teamwork/ Collaboration</td>
<td>Agility</td>
<td>Quality Assurance and Continuous Improvement</td>
</tr>
<tr>
<td>High Performance/Lean</td>
<td>Comfortable with ideas</td>
<td>Health, Safety and the Environment</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Self direction/organization</td>
<td>Sustainability and Green Manufacturing</td>
</tr>
</tbody>
</table>
Maximizing Flexibility

Advanced Manufacturing

- Plastic Products Manufacturing
- Motor Vehicle Parts Manufacturing
- Motor Vehicle Body and Trailer Manufacturing
- Medical Equipment & Supplies Manufacturing
- Pharmaceutical and Medicine Manufacturing

Foundational Skills + Cross-Cutting Technical Skills (and the industry-based credentials that support them)
Maximizing Flexibility

High-Tech Manufacturing

- Pharmaceutical & Medical Manufacturing
- Architectural, Engineering and Related Services
- National Security and International Affairs
- Computer Systems Design and Related Services
- Management of Companies and Other Services
- Professional And Commercial Equipment and Supplies
- Management, Scientific, and Technical Consulting Services

Foundational Skills + Cross-Cutting Technical Skills
(and the industry-based credentials that support them)
A “Win-Win” Scenario

High-Quality Jobs

- Educators
- Employers
- Workers
- Regional Development
Using Data to Drive Decision Making in Skills Certification Implementation

Audrey S. Theis, Ph.D.
Key Links Inc
Using Data to Drive Decision-Making

What types of decisions are needed to support implementation of the certification system?

- What are the economic development priorities of the state/region as relates to manufacturing?
- Do those priorities align with the data? Where are there similarities or differences?
- How can this initiative be designed to support economic development priorities?
## Sample State’s Economic Development Priorities

### Advanced Manufacturing and Logistics
- Motor Vehicles Production
- Parts and Transportation Equipment
- Metals
  - Machinery
- Plastics and Rubber
- Chemicals
- Food Products
- Furniture
- Computers
- Logistics

### Additional Possible Targeted Industries
- Medical Equipment and Supplies Manufacturing
- Pharmaceutical and Medicine Manufacturing
- Architectural, Engineering and Related Services (High-Tech)
- Management, Scientific and Technical Consulting Services (High-Tech)
- Scientific Research and Development Services (High-Tech)
What types of decisions are needed to support implementation of the certification system?

- Which high-growth manufacturing industries, both current and emerging, should be targeted for initial efforts?

- Which high-demand occupational areas, for both advanced manufacturing and high-tech manufacturing, should be targeted for career pathway development?
## Sample State Data

### Sample High-Growth Industries
- Transportation Equipment
- Fabricated Metal Product
- Primary Metal
- Food
- Machinery
- Plastics and Rubber Products
- Chemical

### Sample High-Demand Occupations
- Material Movers
- Welders, Cutters
- Customer Service
- Industrial Truck & Tractor
- Assemblers & Fabricators
- Maintenance and Repair Workers
- Inspectors & Sorters
- First-line Supervisors
Using Data to Drive Decision-Making

What types of decisions are needed to support implementation of the certification system?

- What career pathways (articulated programs of study), if any, have been identified at the state and/or regional level?
- When is the last time those pathway areas were updated?
- Do they span from high school to community college or through four year?
- What additional pathways does the projected data suggest need to be developed?
What types of decisions are needed to support implementation of the certification system?

- What certifications should be included?
- Where should the NCRC be utilized? Feeder programs only?
- What new articulation agreements with four year schools will need to be developed?
### ALIGNING EDUCATION, CERTIFICATION, AND CAREER PATHWAYS

**Advanced Technology Manufacturing Academies at the Alamo Colleges**

<table>
<thead>
<tr>
<th>EDUCATION PATHWAY</th>
<th>CERTIFICATION PATHWAY</th>
<th>CAREER PATHWAY</th>
</tr>
</thead>
</table>
| BACHELOR OF APPLIED ARTS & SCIENCE / ENGINEERING DISCIPLINE (* Potential path not currently articulated) | SME | Plant Engineer  
Mechanical Engineer  
Management |
| Texas State, UTSA, St. Mary’s University |  | $50k - $140k (11-3051, 17-2141) |
| ASSOCIATE IN APPLIED SCIENCE: Manufacturing Operations Technician CNC Manufacturing Technician  
63-69 hours / 2 years full time  
21 courses  
Day/evening curriculum | AWS Certified Welder D.1.1  
MSSC Maintenance Awareness  
MSSC Manufacturing Practices  
MSSC Quality Practices and Measurement  
MSSC Safety  
Career Readiness Certificate | CNC Technician  
Manufacturing Maintenance Technician  
Production workers/assemblers |
| High School Year 2  
CNC Tool Operator Certificate or Manufacturing Operations Maint. Assistant  
Dual Enrollment  
6 courses/17 credit hours | MSSC Manufacturing Practices  
MSSC Maintenance Awareness  
Career Readiness Certificate | Entry level operators  
Maintenance helpers  
Team Assemblers |
| High School Year 1  
Dual enrollment  
Marketable Skills Certificate-Machining  
5 courses/14 credit hours | MSSC Quality Practices & Measurement  
MSSC Safety  
Career Readiness Certificate | Maintenance Helper |
| National Career Readiness Certificate  
Personal Effectiveness * Academic Competencies  
Workplace Competencies | | $17k - $54k (51-2092, 51-2031) |

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Applied STEM (High School)  
Dual Enrollment - Career Academy – Youth Development Programs  
Out of School/Low Skill Youth/Adults  
WIA/Career Centers – ESL/YESL - GED/ABE  
“Bridge” and Foundation Programs  
Skilled Adults  
Retraining/Lay Offs – Continuing Education Company Specific Apprenticeship

Produced with support from **Key Links**
# Aligning Education, Certification and Career Pathways

For the Welding Industry at Lorain County Community College

## Education Pathway

### Masters and PhD
- **Bachelor of Science / Engineering Discipline**
  - Ohio State University
  - Cleveland State University

### Associate in Applied STEM/Science
- **65 Credit Hours / Two Years Full Time**
- **23 Courses**
- **Day / Evening Curriculum**

### STEM Diploma Program
- **37 Credit Hours / One Year Full Time**
- **14 Courses**
- **Day/ Evening Curriculum**

### STEM Certificate Program
- **19 Credit Hours / One Year Part Time**
- **8 Courses**

## Certification Pathway

- **AWS D1.1 Multiple Processes**
- **MSSC Safety**
- **NCRC**
- **ASME Section 9 / API 1104**
- **MSSC CPT**
- **SME Engineering Technologist**
- **AWS D1.1 Multiple Processes / CWI**
- **ASME Section 9 / API 1104**
- **MSSC CPT**
- **NCRC**

## Career Pathway

- **Welding Engineer**
  - $35.68/hour (17-2190)
  - Automation Welding Mgr.
  - 10 – 15 years experience
  - $30.00 to $48.00/hour

- **Welding Technician**
  - Manufacturing Engineering Technician
  - $22.64/hour (17-3026)
  - Welder / Fabricator
  - 5 – 10 years experience
  - $18.00 to $22.00/hour

- **Welder (Entry Level)**
  - $15.84/hour (51-4120)
  - Welder MIG/Repair
  - 3 – 5 years experience
  - $13.00 to $16.00/hour

- **Welder (Entry Level)**
  - $15.84/hour (51-4120)
  - MIG Welder / Entry Level
  - 0 experience
  - $10.00/hour

## National Career Readiness Certificate
- Personal Effectiveness
- Academic Competencies
- Workplace Competencies

## Key Links

- **Applied STEM (High School)**
  - Dual Enrollment - Career Academy - Youth Development Programs

- **Out of School/Low Skill Youth/Adults**
  - WIA/Career Centers – ESL/VESL - GED/ABE
  - "Bridge" and Foundation Programs

- **Skilled Adults**
  - Retraining / Lay Offs – Continuing Education Company Specific Apprenticeship

Produced with support from
Example from the Piedmont Triad, North Carolina
Future Regional Economic Drivers

North Carolina
Aerospace, Aviation and Military Defense, Automotive, Truck and Heavy Equipment, Biotechnology, Pharmaceuticals and Life Sciences, Chemicals, Plastics and Rubber, Green Energy, Information and Communications Technology, Textiles, Apparel and Textile Machinery

Piedmont Triad Region
Advanced Manufacturing with growth in Life Sciences, Pharmaceuticals, Semiconductors, Food Processing, Chemicals, Plastics, and Transportation Equipment.
Profile Content

- General College Description
- Manufacturing-Related Program Areas
- Partnerships with High Schools and Four-year Colleges
- Faculty Expertise/Specialized Knowledge/Skills
- Specialized Facilities/Equipment
- Contract Training Capabilities
ForsythTech Profile

Manufacturing-Related Programs and Services

General College Description:

Forsyth Technical Community College is a comprehensive community college serving the citizens of Forsyth and Stokes counties. It offers a wide array of programs and services at its main campus in Winston-Salem and its 8 other campus locations. Forsyth Tech aims to provide students with exceptional technical education and training, as well as college transfer, adult basic education, and continuing corporate education programs to develop a globally competitive workforce. It offers 67 Associate in Applied Science Degrees, 35 diploma programs, 67 certificate programs, 20 college transfer degrees and a host of other programs including Business and Industry Training, Literacy Education and English for Speakers of other Languages (ESL), Distance Learning Opportunities, and Vocational and Technical Training. See www.forsythtech.edu.

Manufacturing-Related Program Areas:

Forsyth Tech offers a variety of manufacturing-related programs that span several Departments. The college offers Associate Degree, Diploma and Certificate options and graduates approximately 1,050 students each year. Click on the links below to learn more:

- Biotechnology (AAS Degree);
- Electrical/Electronics Technology (Diploma, Certificate);
- Engineering Technologies;
- ...
# Regional Roadmap for Manufacturing

<table>
<thead>
<tr>
<th>Area</th>
<th>Alamance</th>
<th>Davidson</th>
<th>Forsyth</th>
<th>Guilford</th>
<th>Piedmont</th>
<th>Surry</th>
<th>Randolph</th>
<th>Rockingham</th>
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</thead>
<tbody>
<tr>
<td><strong>Mechanical Design/Cad</strong></td>
<td></td>
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<tr>
<td>Mechanical Drafting Technology</td>
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<tr>
<td>Mechanical Engineering Technology</td>
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<tr>
<td><strong>Electrical/Electronics</strong></td>
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<td>Electrical/Electronic Technologies</td>
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<td>Electronics Engineering Technology</td>
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<tr>
<td><strong>Production/Process Technology</strong></td>
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<td>Industrial Systems Technologies</td>
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<td>Machining/Manufacturing Technology</td>
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<td>Life Sciences (Biotechnology, Pharmaceutical Tech, Lab Tech, Bio Mass/Bio Fuels)</td>
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<td>Material Science (Composites, Plastics, Nano Tech)</td>
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<td>Mechatronics</td>
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<td>Transportation Technology (Global Logistics, Truck Driving)</td>
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Produced with support from [Key Links]
State-wide Asset Map

Manufacturing
Caterpillar, Inc. and Forsyth Tech Announcement

- “We’re looking at Forsyth Tech to help us train a quality work force. These machine tools cost millions of dollars a piece and we don’t want to crash them.”

- Michael Murphy
  Caterpillar Executive
Chris Chmura

- President and Chief Economist
- Chmura Economics & Analytics
Observations on Economic Data

- Workforce issues run deeper than net changes in employment
- Identifying demand due to retirement and movement to other occupations may unveil some perception busters
- Identify supply-chain clusters to create better occupation/skill forecasts
Questions?
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  gcarrick@nam.org

- Audrey Theis  
  President  
  Key Links, Inc.  
  (503) 233-2645  
  astheis@keylinksinc.com
2011 Schedule of Webinars

Webinars will be from 12:00-1:30 p.m. Eastern Time

- August 17
- September 21
- October 18
- November 16