



# Manufacturing Career Cluster

## PLAN OF STUDY

<http://www.nd.gov/cte/services/career-clusters/>  
<http://www.careerclusters.org>

Name \_\_\_\_\_

School \_\_\_\_\_

Date \_\_\_\_\_



(7/10/2010 CTE revision)

### SAMPLE OCCUPATIONS RELATING TO THIS CAREER CLUSTER

Pathway	Occupations (also include Trade and Industry, Tech Ed. and Information Technology Teachers)
PRODUCTION	Welder • Machinist & Tool Maker • Pipefitter – Assembler - Machine Operator – Millwright – Painter – Sheet Metal Worker
MANUFACTURING PROCESS PRODUCTION DEVELOPMENT	Mechanical Engineer • Structural Engineer • Industrial Technology/Mechanic • Design Engineer • Industrial Engineer • Power Generating & Reactor Plant Operator • Purchasing Agent • Manufacturing Engineer • Precision Inspector/Tester/Grader – CAD Operator
MAINTENANCE, INSTALLATION & REPAIR	Auto body Repair • Boilermaker • Communication Systems Installer/Repairer • Computer Repair Technician (A+ Certification) • Electronics Technologist • Industrial Facilities Manager • Instrument Calibration & Repairer • Maintenance Repairer • Millwright • Plumber/Pipe Fitter/Steam Fitter
QUALITY ASSURANCE	Calibration Technician • Inspector • Quality Control Technician
LOGISTICS & INVENTORY CONTROL	Dispatcher • Freight/Stock/Material Mover • Industrial Truck & Tractor Operator • Material Handler • Material Mover • Traffic/Shipping/Receiving Clerk
HEALTH, SAFETY & ENVIRONMENTAL ASSURANCE	Environmental Engineer • Health & Safety Representative • Safety Coordinator • Safety Team Leader • Safety Technician

### SUGGESTED COURSE OF HIGH SCHOOL STUDY

It is suggested that students consider appropriate units of dual credit, articulation, or advanced placement opportunities for postsecondary credit.

English (four units required to graduate; including literature, composition, and speech)	Math (three units required to graduate)	Science (three units required to graduate)	Social Studies (three units required to graduate)	Physical Education (one unit required to graduate)	Career & Technical Education and Other Electives (three units of foreign or Native American language, fine arts, or career and technical education required to graduate)	Additional Suggested Learning Opportunities
<input type="checkbox"/> *English 9 <input type="checkbox"/> *English 10 <input type="checkbox"/> *English 11 <input type="checkbox"/> *English 12  <input type="checkbox"/> Speech or Debate <input type="checkbox"/> Literature <input type="checkbox"/> Creative Writing <input type="checkbox"/> AP English <input type="checkbox"/> College Composition <input type="checkbox"/> Dual Credit Classes *Required Units	<input type="checkbox"/> Intro to Algebra <input type="checkbox"/> Consumer Math <b>College Prep:</b> <input type="checkbox"/> Algebra <input type="checkbox"/> Geometry <input type="checkbox"/> Advanced Algebra <input type="checkbox"/> Advanced Math <input type="checkbox"/> Pre-Calculus <input type="checkbox"/> AP Calculus <input type="checkbox"/> College Algebra <input type="checkbox"/> Probability & Stat <input type="checkbox"/> Dual Credit Classes	<input type="checkbox"/> *Physical Science <input type="checkbox"/> *Biology <input type="checkbox"/> *1 additional unit  <input type="checkbox"/> Advanced Biology <input type="checkbox"/> Physics <input type="checkbox"/> Advanced Physics <input type="checkbox"/> Chemistry <input type="checkbox"/> Horticulture/Plant Sci <input type="checkbox"/> Environmental Sci. <input type="checkbox"/> Geology <input type="checkbox"/> Dual Credit Classes	<input type="checkbox"/> *U.S. History <input type="checkbox"/> *American Gov 1/2 <b>and</b> <input type="checkbox"/> *Economics 1/2 or <input type="checkbox"/> *Problems of Democracy <b>and</b> <input type="checkbox"/> 1 additional unit <input type="checkbox"/> Psychology <input type="checkbox"/> ND or World Hist. <input type="checkbox"/> Geography	<input type="checkbox"/> *Physical Education 1 unit <b>or</b> <input type="checkbox"/> *Physical Ed 1/2 <b>and</b> <input type="checkbox"/> *Health 1/2  1/2 = 1/2 unit	<input type="checkbox"/> Agricultural Mechanics I, II, III <input type="checkbox"/> Agricultural Welding & Fabrication <input type="checkbox"/> Agricultural Processing <input type="checkbox"/> Welding I & II <input type="checkbox"/> Production &/or Manufacturing Technology <input type="checkbox"/> Energy & Transportation <input type="checkbox"/> Engineering Technology <input type="checkbox"/> Design/Drafting <input type="checkbox"/> Skills for Living <input type="checkbox"/> Introduction to Computer Applications <input type="checkbox"/> Introduction to Electricity and Electronic Concepts <input type="checkbox"/> Computer Integrated Manufacturing	<b>School-Based:</b> <input type="checkbox"/> SkillsUSA &/or TSA <input type="checkbox"/> Career Research <input type="checkbox"/> Cooperative Work Exper. <input type="checkbox"/> Internship or Job Shadow <input type="checkbox"/> Service Learning Project <input type="checkbox"/> Invent It <b>Community-Based:</b> <input type="checkbox"/> Mentorship <input type="checkbox"/> Volunteer <input type="checkbox"/> Part-time Employment <input type="checkbox"/> Apprenticeship

### EXAMPLES OF NORTH DAKOTA APPRENTICESHIP OPPORTUNITIES AND POSTSECONDARY PROGRAMS RELATED TO THIS CAREER CLUSTER

Pathway	Apprenticeship Opportunities	Associate Degree or Less	Bachelors Degree	Masters Degree or More
PRODUCTION	<input type="checkbox"/> Machinist <input type="checkbox"/> Welder	<input type="checkbox"/> Welding (BSC, LRSC, NDSCS, TMCC) <input type="checkbox"/> Machinist & Tool Maker (NDSCS)		
MANUFACTURING PROCESS PRODUCTION DEVELOPMENT	<input type="checkbox"/> Machinist	<input type="checkbox"/> Automated Manufacturing Technician (NDSCS) <input type="checkbox"/> Industrial Technology & Tool Maker (BSC) <input type="checkbox"/> Electrical Transmission Systems Technology (BSC) <input type="checkbox"/> +Power Plant/Process Plant Operation (BSC, TMCC)	<input type="checkbox"/> Industrial Technology/Mechanic (UND)	<input type="checkbox"/> Industrial Technology/Mechanic (UND)
MAINTENANCE, INSTALLATION & REPAIR	<input type="checkbox"/> Boilermaker <input type="checkbox"/> Gas Appliance Servicer <input type="checkbox"/> Plumber, Steamfitter/Pipefitter <input type="checkbox"/> Sheet Metal Worker <input type="checkbox"/> Sprinkler Fitters Apprenticeship <input type="checkbox"/> Welder	<input type="checkbox"/> Mechanical Systems (NDSCS) <input type="checkbox"/> Plumbing (NDSCS) <input type="checkbox"/> Simulator Maintenance Technology (LRSC) <input type="checkbox"/> Welding (BSC, FBCC, LRSC, NDSCS, TMCC) <input type="checkbox"/> Machinist & Tool Maker (NDSCS) <input type="checkbox"/> Electrical/Electronics Technology (BSC, NDSCS) <input type="checkbox"/> HVAC/R (BSC, NDSCS) <input type="checkbox"/> Water Treatment Technology (BSC)	<input type="checkbox"/> Industrial Technology/Mechanic (UND) <input type="checkbox"/> Environmental Design – (NDSU)	<input type="checkbox"/> Industrial Technology/Mechanic (UND)
QUALITY ASSURANCE	<input type="checkbox"/> Instrument Tech (Utilities)	<input type="checkbox"/> Machinist & Tool Maker (NDSCS)		
LOGISTICS & INVENTORY CONTROL	<input type="checkbox"/> Truck Driver	<input type="checkbox"/> Truck Driving (G's Driving School – Minot)	<input type="checkbox"/> +Transportation & Logistics (NDSU)	<input type="checkbox"/> +Transportation & Logistics (NDSU)
HEALTH, SAFETY & ENVIRONMENTAL ASSURANCE	For more about Apprenticeships: <a href="http://bat.doleta.gov/bat.cfm">http://bat.doleta.gov/bat.cfm</a>	<input type="checkbox"/> +Emergency Management (NDSCS)	<input type="checkbox"/> +Emergency Management (NDSU)	<input type="checkbox"/> +Emergency Management (NDSU)

+These major fields may also be found in related clusters including Ag, Food & Natural Resources; Law, Public Safety & Emergency Management; Transportation, Dist. & Logistics.

BJCC – Burdick Job Corps, BSC – Bismarck State College, FBCC – Fort Berthold Community College, LRSC – Lake Region State College, NDSCS – North Dakota State College of Science, NDSU – North Dakota State University, TMCC – Turtle Mountain Community College, UND – University of ND. (7/10/2010 CTE revision)