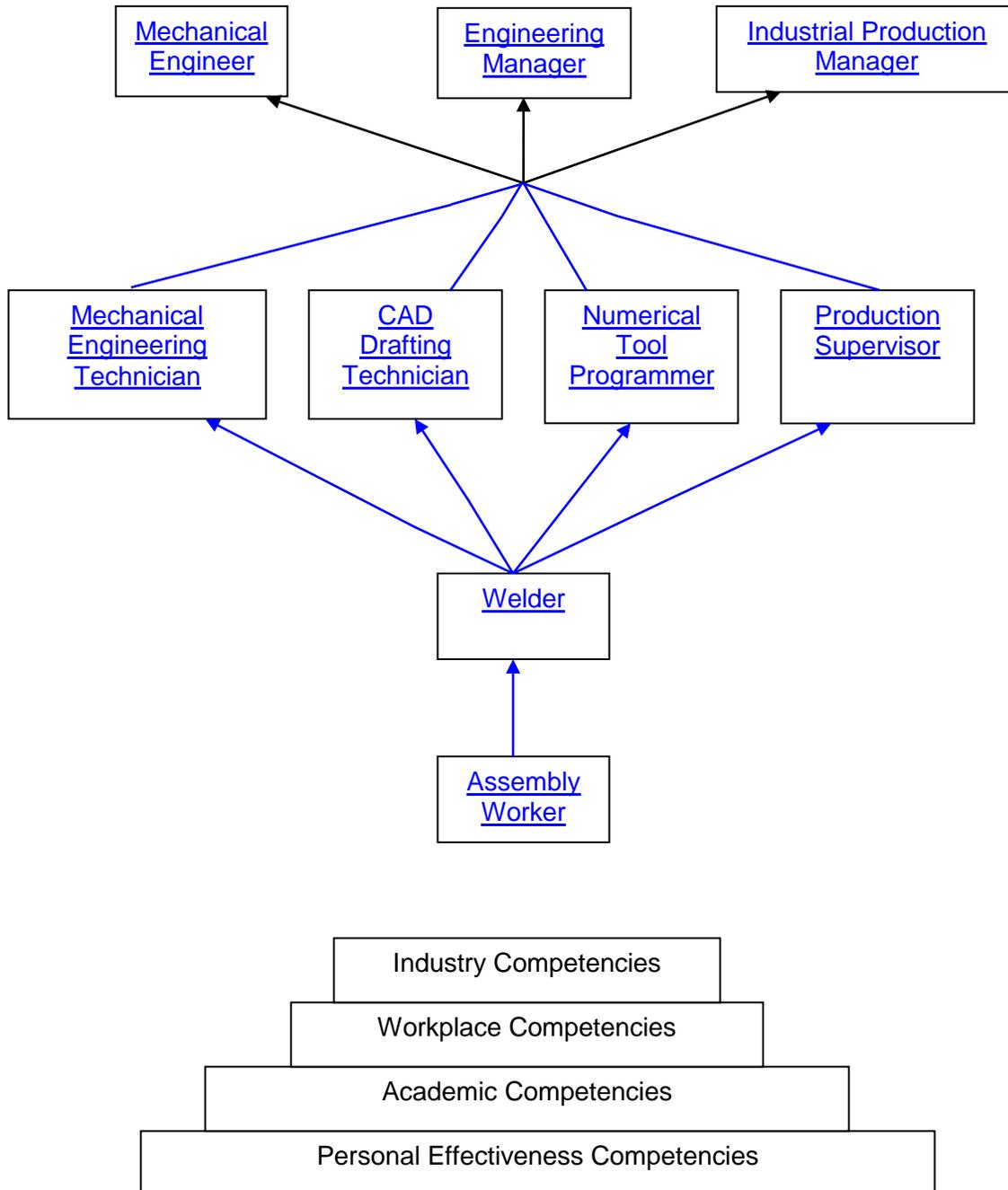


# Sample Career Ladder/Lattice for Advanced Manufacturing

Click on a job title to see examples of descriptive information about the job.

Click on a link between job titles to see the critical development experiences needed to move to that job on the pathway.



This is a SAMPLE.

It is intended only as an illustration of a possible career ladder/lattice in the advanced manufacturing industry.

# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Mechanical Engineer</b>
<b>Job Title</b>
Mechanical Engineer
<b>Job Level</b>
Management-level (Supervisory)
<b>Job Description</b>
<p>Plans and designs tools, engines, machines, and other mechanically functioning equipment. Oversees installation, operation, maintenance, and repair of such equipment as centralized heat, gas, water, and steam systems. Tasks:</p> <ol style="list-style-type: none"> <li>1. Read and interpret blueprints, technical drawings, schematics, and computer-generated reports.</li> <li>2. Confer with engineers and other personnel to implement operating procedures, resolve system malfunctions, and provide technical information.</li> <li>3. Research and analyze customer design proposals, specifications, manuals, and other data to evaluate the feasibility, cost, and maintenance requirements of designs or applications.</li> <li>4. Specify system components or direct modification of products to ensure conformance with engineering design and performance specifications.</li> <li>5. Research, design, evaluate, install, operate, and maintain mechanical products, equipment, systems and processes to meet requirements, applying knowledge of engineering principles.</li> <li>6. Investigate equipment failures and difficulties to diagnose faulty operation, and to make recommendations to maintenance crew.</li> <li>7. Assist drafters in developing the structural design of products using drafting tools or computer-assisted design (CAD) or drafting equipment and software.</li> <li>8. Provide feedback to design engineers on customer problems and needs.</li> <li>9. Oversee installation, operation, maintenance, and repair to ensure that machines and equipment are installed and functioning according to specifications.</li> <li>10. Conduct research that tests and analyzes the feasibility, design, operation and performance of equipment, components and systems.</li> </ol>
<b>Education</b>
Bachelor's degree required, generally in engineering.
<b>Workforce Preparation</b>
<b>Work Experience</b>
Employees in these positions usually need several years of work-related experience, on-the-job training, and/or vocational training.
<b>Licensure/Certification</b>
Varies by state. In the state of Virginia, the Fundamentals of Engineering (FE) exam must be passed to be qualified as an Engineer-in-Training. The Principles and Practice of Engineering examination must be passed to be qualified as a Professional Engineer. Both examinations must be passed to qualify as an engineer.
<b>Salary</b>
\$32.49 hourly, \$67,600 annually
<b>Employment Outlook</b>
10-20% over the next 10 years, representing average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Engineering Manager</b>
<b>Job Title</b>
Engineering Manager
<b>Job Level</b>
Management-level (Supervisory)
<b>Job Description</b>
Plans, directs, or coordinates activities in engineering. Plans, directs, or coordinates research and development in engineering. Tasks:
<ol style="list-style-type: none"> <li>1. Confer with management, production, and marketing staff to discuss project specifications and procedures.</li> <li>2. Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.</li> <li>3. Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects.</li> <li>4. Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.</li> <li>5. Direct, review, and approve product design and changes.</li> <li>6. Recruit employees, assign, direct, and evaluate their work, and oversee the development and maintenance of staff competence.</li> <li>7. Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.</li> <li>8. Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.</li> <li>9. Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.</li> <li>10. Review and recommend or approve contracts and cost estimates.</li> </ol>
<b>Education</b>
A Bachelor's degree is the minimum formal education required. However, many positions also require a Master's degree and/or a Ph.D. or J.D.
<b>Workforce Preparation</b>
Employees may need some on-the-job training, but most of these positions assume that the person will already have the required skills, knowledge, work-related experience, and/or training.
<b>Work Experience</b>
Extensive skill, knowledge, and experience are needed for these positions. Many require more than five years of experience.
<b>Licensure/Certification</b>
Typically, an engineering manager must first be a licensed engineer. First, an Engineering-in-Training license must be acquired and then a Professional Engineer license must be acquired.
<b>Salary</b>
\$48.44 hourly, \$100,760 annually
<b>Employment Outlook</b>
10-20% over the next 10 years, representing average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Industrial Production Manager</b>
<b>Job Title</b>
Industrial Production Manager
<b>Job Level</b>
Management-level (Supervisory)
<b>Job Description</b>
Plans, directs, or coordinates the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications. Tasks: <ol style="list-style-type: none"> <li>1. Direct and coordinate production, processing, distribution, and marketing activities of industrial organization.</li> <li>2. Develop budgets and approve expenditures for supplies, materials, and human resources, ensuring that materials, labor and equipment are used efficiently to meet production targets.</li> <li>3. Review processing schedules and production orders to make decisions concerning inventory requirements, staffing requirements, work procedures, and duty assignments, considering budgetary limitations and time constraints.</li> <li>4. Review operations and confer with technical or administrative staff to resolve production or processing problems.</li> <li>5. Hire, train, evaluate, and discharge staff, and resolve personnel grievances.</li> <li>6. Initiate and coordinate inventory and cost control programs.</li> <li>7. Prepare and maintain production reports and personnel records.</li> <li>8. Set and monitor product standards, examining samples of raw products or directing testing during processing, to ensure finished products are of prescribed quality.</li> <li>9. Develop and implement production tracking and quality control systems, analyzing production, quality control, maintenance, and other operational reports, to detect production problems.</li> <li>10. Review plans and confer with research and support staff to develop new products and processes.</li> </ol>
<b>Education</b>
Bachelor's degree typically required.
<b>Workforce Preparation</b>
<b>Work Experience</b>
Employees in these positions usually need several years of work-related experience, on-the-job training, and/or vocational training. A minimum of two to four years of work-related skill, knowledge, or experience is needed for these positions.
<b>Licensure/Certification</b>
None required.
<b>Salary</b>
\$36.34 hourly, \$75,580 annually
<b>Employment Outlook</b>
0-9% over the next 10 years, representing slower than average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Mechanical Engineering Technician</b>
<b>Job Title</b>
Mechanical Engineering Technician
<b>Job Level</b>
Mid-level (Non-supervisory)
<b>Job Description</b>
<p>Applies theory and principles of mechanical engineering to modify, develop, and test machinery and equipment under direction of engineering staff or physical scientists. Tasks:</p> <ol style="list-style-type: none"> <li>1. Prepare parts sketches and write work orders and purchase requests to be furnished by outside contractors.</li> <li>2. Draft detail drawing or sketch for drafting room completion or to request parts fabrication by machine, sheet or wood shops.</li> <li>3. Review project instructions and blueprints to ascertain test specifications, procedures, and objectives, and test nature of technical problems such as redesign.</li> <li>4. Review project instructions and specifications to identify, modify and plan requirements fabrication, assembly and testing.</li> <li>5. Devise, fabricate, and assemble new or modified mechanical components for products such as industrial machinery or equipment, and measuring instruments.</li> <li>6. Discuss changes in design, method of manufacture and assembly, and drafting techniques and procedures with staff and coordinate corrections.</li> <li>7. Set up and conduct tests of complete units and components under operational conditions to investigate proposals for improving equipment performance.</li> <li>8. Inspect lines and figures for clarity and return erroneous drawings to designer for correction.</li> <li>9. Analyze test results in relation to design or rated specifications and test objectives, and modify or adjust equipment to meet specifications.</li> </ol>
<b>Education</b>
Associate's degree typically required. Bachelor's degree may be required. Most employers prefer to hire someone with at least a 2-year Associate's degree in engineering technology.
<b>Workforce Preparation</b>
Employees in these positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.
<b>Work Experience</b>
Previous work-related skill, knowledge, or experience is required for these positions.
<b>Licensure/Certification</b>
License typically required. The National Institute for Certification in Engineering Technologies has established a voluntary certification program for engineering technicians. Certification is available at various levels.
<b>Salary</b>
\$21.55 hourly, \$44,830 annually
<b>Employment Outlook</b>
10-20% over the next 10 years, representing average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

## **Critical Development Experiences: From Mechanical Engineering Technician to Mechanical Engineer**

Mechanical Engineering positions require a Bachelor's degree, generally in engineering.

1. Confer with engineers and other personnel to implement operating procedures, resolve system malfunctions, and provide technical information.
2. Participate in researching and analyzing customer design proposals, specifications, manuals, and other data to evaluate the feasibility, cost, and maintenance requirements of designs or applications.
3. Participate in research that evaluates the feasibility, design, operation and performance of equipment, components and systems.

## **Critical Development Experiences: From Mechanical Engineering Technician to Engineering Manager**

For Engineering Manager positions, a Bachelor's degree is the minimum formal education required. However, many positions also require a Master's degree and/or a Ph.D. or J.D.

1. Confer with management, production, and marketing staff to discuss project specifications and procedures.
2. Coordinate and direct projects, make detailed plans to accomplish goals and direct the integration of technical activities.

## **Critical Development Experiences: From Mechanical Engineering Technician to Industrial Production Manager**

Industrial Production Manager positions require a Bachelor's degree, generally in engineering.

1. Participate in the initiation and coordination of inventory and cost control programs.
2. Participate in the development and implementation of production tracking and quality control systems, analyze production, quality control, maintenance, and other operational reports to detect production problems.
3. Review plans and confer with research and support staff to develop new products and processes.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Computer-Aided Design (CAD) Drafting Technician</b>
<b>Job Title</b>
Computer-Aided Design (CAD) Drafting Technician
<b>Job Level</b>
Mid-level (Supervisory)
<b>Job Description</b>
<p>Prepare drawings and topographical and relief maps used in civil engineering projects, such as highways, bridges, pipelines, flood control projects, and water and sewerage control systems. Tasks:</p> <ol style="list-style-type: none"> <li>1. Use computer-aided drafting equipment and/or conventional drafting stations, technical handbooks, tables, calculators, and traditional drafting tools such as boards, pencils, protractors, and T-squares.</li> <li>2. Confer with engineering staff and other personnel to resolve problems.</li> <li>3. Draft working drawings, wiring diagrams, wiring connection specifications or cross-sections of underground cables, as required for instructions to installation crew.</li> <li>4. Draw master sketches to scale showing relation of proposed installations to existing facilities and exact specifications and dimensions.</li> <li>5. Measure factors that affect installation and arrangement of equipment, such as distances to be spanned by wire and cable.</li> <li>6. Assemble documentation packages and produce drawing sets which are then checked by an engineer or an architect.</li> <li>7. Review completed construction drawings and cost estimates for accuracy and conformity to standards and regulations.</li> <li>8. Prepare and interpret specifications, calculating weights, volumes, and stress factors.</li> <li>9. Explain drawings to production or construction teams and provide adjustments as necessary.</li> <li>10. Supervise and train other technologists, technicians, and drafters.</li> </ol>
<b>Education</b>
Most positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree.
<b>Workforce Preparation</b>
Usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.
<b>Work Experience</b>
Previous work-related skill, knowledge, or experience is required for these positions.
<b>Licensure/Certification</b>
Licensure required. Type of licensing exam varies by specialization. For example, an Architectural CAD Drafter must pass the Architectural Licensing Exam in the state of occupation.
<b>Salary</b>
\$19.42 hourly, \$40,390 annually
<b>Employment Outlook</b>
0-9% over the next 10 years, representing slower than average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

## **Critical Development Experiences: From CAD Drafting Technician to Mechanical Engineer**

Mechanical Engineering positions require a Bachelor's degree, generally in engineering.

1. Provide feedback to design engineers on customer problems and needs.
2. Assist in overseeing installation, operation, maintenance, and repair of equipment to ensure that machines are installed and functioning according to specifications.

## **Critical Development Experiences: From CAD Drafting Technician to Engineering Manager**

For Engineering Manager positions, a Bachelor's degree is the minimum formal education required. However, many positions also require a Master's degree and/or a Ph.D. or J.D.

1. Confer with management, production, and marketing staff to discuss project specifications and procedures.
2. Coordinate and direct a project, making detailed plans to accomplish goals and directing the integration of technical activities.

## **Critical Development Experiences: From CAD Drafting Technician to Industrial Production Manager**

Industrial Production Manager positions require a Bachelor's degree, generally in engineering.

1. Assist in the initiation and coordination of inventory and cost control programs.
2. Prepare and maintain production reports and personnel records.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Numerical Tool Programmer</b>
<b>Job Title</b>
Numerical Tool Programmer
<b>Job Level</b>
Mid-level (Supervisory)
<b>Job Description</b>
<p>Develops programs to control machining or processing of parts by automatic machine tools, equipment, or systems. Tasks:</p> <ol style="list-style-type: none"> <li>1. Determine the sequence of machine operations, and select the proper cutting tools needed to machine work pieces into the desired shapes.</li> <li>2. Revise programs and/or tapes to eliminate errors, and retest programs to check that problems have been solved.</li> <li>3. Analyze job orders, drawings, blueprints, specifications, printed circuit board pattern films, and design data in order to calculate dimensions, tool selection, machine speeds, and feed rates.</li> <li>4. Determine reference points, machine cutting paths, or hole locations, and compute angular and linear dimensions, radii, and curvatures.</li> <li>5. Observe machines on trial runs or conduct computer simulations to ensure that programs and machinery will function properly and produce items that meet specifications.</li> <li>6. Compare encoded tapes or computer printouts with original part specifications and blueprints to verify accuracy of instructions.</li> <li>7. Enter coordinates of hole locations into program memories by depressing pedals or buttons of programmers.</li> <li>8. Write programs in the language of a machine's controller and store programs on media such as punch tapes, magnetic tapes, or disks.</li> <li>9. Modify existing programs to enhance efficiency.</li> </ol>
<b>Education</b>
Most positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree.
<b>Workforce Preparation</b>
Employees in these positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers
<b>Work Experience</b>
Previous work-related skill, knowledge, or experience is required for these positions.
<b>Licensure/Certification</b>
Licensure required. License requirements vary by state.
<b>Salary</b>
\$20.11 hourly, \$41,830 annually
<b>Employment Outlook</b>
Much slower than average (negative growth)

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## Sample Career Ladder/Lattice for Advanced Manufacturing

### **Critical Development Experiences: From Numerical Tool Programmer to Mechanical Engineer**

Mechanical Engineering positions require a Bachelor's degree, generally in engineering.

1. Assist in the development and implementation of production tracking and quality control systems. Analyze production, quality control, maintenance, and other operational reports to detect production problems.
2. Review operations and confer with technical or administrative staff to resolve production or processing problems.
3. Prepare and maintain production reports and personnel records.

### **Critical Development Experiences: From Numerical Tool Programmer to Engineering Manager**

For Engineering Manager positions, a Bachelor's degree is the minimum formal education required. However, many positions also require a Master's degree and/or a Ph.D. or J.D.

1. Confer with management, production, and marketing staff to discuss project specifications and procedures.
2. Coordinate and direct a project, making detailed plans to accomplish goals and directing the integration of technical activities.

### **Critical Development Experiences: From Numerical Tool Programmer to Industrial Production Manager**

Industrial Production Manager positions require a Bachelor's degree, generally in engineering.

1. Review operations and confer with technical or administrative staff to resolve production or processing problems.
2. Assist in the development and implementation of production tracking and quality control systems. Analyze production, quality control, maintenance, and other operational reports to detect production problems.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Production Supervisor</b>
<b>Job Title</b>
Production Supervisor
<b>Job Level</b>
Mid-level (Supervisory)
<b>Job Description</b>
Supervise and coordinate the activities of production and operations workers, such as inspectors, precision workers, machine setters and operators, assemblers, fabricators, and plant and system operators.
Tasks:
<ol style="list-style-type: none"> <li>1. Enforce safety and sanitation regulations.</li> <li>2. Direct and coordinate the activities of employees engaged in the production or processing of goods, such as inspectors, machine setters, and fabricators.</li> <li>3. Read and analyze charts, work orders, production schedules, and other records and reports, in order to determine production requirements and to evaluate current production estimates and outputs.</li> <li>4. Confer with other supervisors to coordinate operations and activities within or between departments.</li> <li>5. Plan and establish work schedules, assignments, and production sequences to meet production goals.</li> <li>6. Inspect materials, products, or equipment to detect defects or malfunctions.</li> <li>7. Demonstrate equipment operations and work and safety procedures to new employees, or assign employees to experienced workers for training.</li> <li>8. Observe work, and monitor gauges, dials, and other indicators to ensure that operators conform to production or processing standards.</li> <li>9. Confer with management or subordinates to resolve worker problems, complaints, or grievances.</li> <li>10. Interpret specifications, blueprints, job orders, and company policies and procedures for workers.</li> </ol>
<b>Education</b>
Most positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree.
<b>Workforce Preparation</b>
Employees in these positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.
<b>Work Experience</b>
Previous work-related skill, knowledge, or experience is required for these positions.
<b>Licensure/Certification</b>
Licensure required. License requirements vary by state.
<b>Salary</b>
\$22.18 hourly, \$46,140 annually
<b>Employment Outlook</b>
0-9% over the next 10 years, representing slower than average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

## **Critical Development Experiences: From Production Supervisor to Mechanical Engineer**

Mechanical Engineering positions require a Bachelor's degree, generally in engineering.

1. Confer with engineers and other personnel to implement operating procedures, resolve system malfunctions, and provide technical information.
2. Assist drafters in developing the structural design of products using drafting tools or computer-assisted design (CAD) or drafting equipment and software.

## **Critical Development Experiences: From Production Supervisor to Engineering Manager**

For Engineering Manager positions, a Bachelor's degree is the minimum formal education required. However, many positions also require a Master's degree and/or a Ph.D. or J.D.

1. Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
2. Assist in developing and implementing policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
3. Assist in planning and directing the installation, testing, operation, maintenance, and repair of facilities and equipment.
4. Confer with management, production, and marketing staff to discuss project specifications and procedures.
5. Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.

## **Critical Development Experiences: From Production Supervisor to Industrial Production Manager**

Industrial Production Manager positions require a Bachelor's degree, generally in engineering.

1. Direct and coordinate production, processing, distribution, and marketing activities of industrial organization
2. Review processing schedules and production orders to make decisions concerning inventory requirements, staffing requirements, work procedures, and duty assignments, considering budgetary limitations and time constraints.
3. Review operations and confer with technical or administrative staff to resolve production or processing problems.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Welder</b>
<b>Job Title</b>
Welder
<b>Job Level</b>
Entry-level (Non-supervisory)
<b>Job Description</b>
<p>Uses hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products. Tasks:</p> <ol style="list-style-type: none"> <li>1. Operate safety equipment, and use safe work habits.</li> <li>2. Weld components in flat, vertical, or overhead positions.</li> <li>3. Ignite torches or start power supplies and strike arcs by touching electrodes to metals being welded.</li> <li>4. Clamp, hold, tack-weld, heat-bend, grind and/or bolt component parts to obtain required configurations and positions for welding.</li> <li>5. Detect faulty operation of equipment and/or defective materials, and notify supervisors.</li> <li>6. Operate manual or semi-automatic welding equipment to fuse metal segments, using processes such as gas tungsten arc, gas metal arc, flux-cored arc, plasma arc, shielded metal arc, resistance welding, and submerged arc welding.</li> <li>7. Monitor the fitting, burning, and welding processes to avoid overheating of parts or warping, shrinking, distortion, or expansion of material.</li> <li>8. Examine work pieces for defects, and measure work pieces with straightedges or templates to ensure conformance with specifications.</li> <li>9. Recognize, set up, and operate hand and power tools common to the welding trade, such as shielded metal arc and gas metal arc welding equipment.</li> </ol>
<b>Education</b>
These positions usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an Associate's or Bachelor's degree could be needed.
<b>Workforce Preparation</b>
<b>Work Experience</b>
Some previous work-related skill, knowledge, or experience may be helpful in these positions, but usually is not needed. Employees may be required to work a few months to one year with experienced employees.
<b>Licensure/Certification</b>
None required. A certification is not required for this position, but it is required by some employers in order to work on various job sites.
<b>Salary</b>
\$14.90 hourly, \$30,990 annually
<b>Employment Outlook</b>
0-9% over the next 10 years, representing slower than average growth.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

## **Critical Development Experiences: From Welder to Mechanical Engineering Technician**

Mechanical Engineering Technician positions typically require an Associate's degree. Employees in these positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

1. Assist in devising, fabricating, and assembling new or modified mechanical components for products such as industrial machinery or equipment, and measuring instruments.

## **Critical Development Experiences: From Welder to CAD Drafting Technician**

Most CAD Drafting Technician positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree. Employees usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

1. Demonstrate equipment operations and work and safety procedures to new employees, or assign employees to experienced workers for training.
2. Observe work, and monitor gauges, dials, and other indicators to ensure that operators conform to production or processing standards.

## **Critical Development Experiences: From Welder to Numerical Tool Programmer**

Most Numerical Tool Programmer positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree. Employees in these positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

1. Determine the sequence of machine operations, and select the proper cutting tools needed to machine work pieces into the desired shapes.
2. Observe machines on trial runs or conduct computer simulations to ensure that programs and machinery will function properly and produce items that meet specifications.

## **Critical Development Experiences: From Welder to Production Supervisor**

Most Production Supervisor positions require training in vocational schools, related on-the-job experience, or an Associate's degree. Some may require a Bachelor's degree. Employees in Production Supervisor positions usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

1. Inspect materials, products, or equipment to detect defects or malfunctions.
2. Observe work, and monitor gauges, dials, and other indicators to ensure that operators conform to production or processing standards.

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# Sample Career Ladder/Lattice for Advanced Manufacturing

<b>Assembly Worker</b>
<b>Job Title</b>
Assembly Worker
<b>Job Level</b>
Entry-level (Non-supervisory)
<b>Job Description</b>
Assembles or modifies electrical or electronic equipment, such as computers, tests equipment telemetering systems, electric motors, and batteries. Tasks:
<ol style="list-style-type: none"> <li>1. Inspect and test wiring installations, assemblies, and circuits for resistance factors and for operation; and record results.</li> <li>2. Assemble electrical or electronic systems and support structures; and install components, units, subassemblies, wiring, and assembly casings, using rivets, bolts, soldering and micro-welding equipment.</li> <li>3. Adjust, repair, or replace electrical or electronic component parts to correct defects and to ensure conformance to specifications.</li> <li>4. Clean parts, using cleaning solutions, air hoses, and cloths.</li> <li>5. Read and interpret schematic drawings, diagrams, blueprints, specifications, work orders, and reports in order to determine materials requirements and assembly instructions.</li> <li>6. Mark and tag components so that stock inventory can be tracked and identified.</li> <li>7. Position, align, and adjust work pieces and electrical parts to facilitate wiring and assembly.</li> <li>8. Pack finished assemblies for shipment and transport them to storage areas, using hoists or hand trucks.</li> <li>9. Confer with supervisors or engineers to plan and review work activities, and to resolve production problems.</li> <li>10. Explain assembly procedures or techniques to other workers.</li> </ol>
<b>Education</b>
These positions usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an Associate's or Bachelor's degree could be needed.
<b>Workforce Preparation</b>
Employees in these positions need anywhere from a few months to one year of on-the-job training with experienced employees.
<b>Work Experience</b>
Some previous work-related skill, knowledge, or experience may be helpful in these positions, but usually is not needed.
<b>Licensure/Certification</b>
None required.
<b>Salary</b>
\$12.08 hourly, \$25,130 annually
<b>Employment Outlook</b>
Much slower than average (negative growth)

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## Sample Career Ladder/Lattice for Advanced Manufacturing

### Critical Development Experiences: From Assembly Worker to Welder

Welder positions usually require a high school diploma and may require some vocational training or job-related course work.

1. Clamp, hold, tack-weld, heat-bend, grind and/or bolt component parts to obtain required configurations and positions for welding.
2. Monitor the fitting, burning, and welding processes to avoid overheating of parts or warping, shrinking, distortion, or expansion of material.

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