WORKFORCE INITIATIVE NETWORK

# MATERIALS ENGINEER

## What do they do?

Materials Engineers research, design, develop, and test metals, plastics, ceramics, composites, and other materials used in manufacturing and engineering applications. They play a critical role in industries such as aerospace, automotive, heavy equipment, machining, mold making, and 3D printing by ensuring materials meet safety, durability, and performance standards.

### Summary of Duties

- Conduct research to develop new materials or improve existing ones
- Test materials for strength, durability, and performance
- Analyze failures and recommend improvements
- Collaborate with mechanical, electrical, and industrial engineers
- Oversee manufacturing processes to ensure quality standards
- Apply knowledge of metallurgy, polymers, ceramics, and composites

## Employment, Wages & Skills

| Starting | Average | Experienced |
|---|---|---|
| \$30/hr | \$44/hr | \$60+/hr |

### Employment Requirements

- Bachelor’s degree in materials engineering, metallurgical engineering, or a related discipline
- Master’s or PhD may be required for research or advanced roles
- Licensing by a provincial/territorial association of professional engineers (P.Eng.) required to practice as a professional engineer
- On-the-job experience or co-op placements during study highly recommended

**Skills You'll Build**

- Materials testing and analysis
- Metallurgy and polymer science
- Failure analysis and quality control
- CAD and simulation software for material design
- Collaboration with cross-disciplinary engineering teams
- Innovation in sustainable and advanced manufacturing

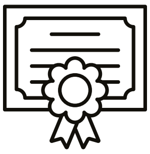
## A Day in the Life

A materials engineer may begin the day in a lab, running tensile or fatigue tests on metal or composite samples. Later, they may meet with a manufacturing team to discuss product performance, review blueprints for a new mold or machine part, and suggest alternative materials to reduce cost or improve durability. Documentation, reporting, and collaboration with engineers across disciplines are key parts of their day.

## Why Choose This Career?

- High relevance to **multiple** industries: machining, 3D printing, mold making, heavy equipment, aerospace
- Opportunities to work on *cutting-edge* materials (composites, polymers, nanomaterials)
- **Strong** career prospects with diverse applications
- Potential for innovation in sustainability and renewable technologies
- Combination of **hands-on lab work** and strategic problem solving

## Certification & Training



- Bachelor's degree in materials, metallurgical, or chemical engineering
- P.Eng. licensure required in Canada for professional practice
- Specialized certifications in welding, metallurgy, or advanced composites are assets
- Continuous learning in nanomaterials, additive manufacturing, and sustainability practices

**Next Steps for High School Graduates:**

- Focus on math, chemistry, and physics courses
- Explore co-op programs for hands-on lab and industry experience
- Enroll in a Bachelor of Engineering program specializing in materials, metallurgical, or chemical engineering

## Material Engineer Education Pathway

| Institution | Program | Credential & Duration | Key Focus Areas |
| --- | --- | --- | --- |
| University of Toronto – Faculty of Applied Science & Engineering | Materials Engineering (BASc) | 4-year Honours degree | Additive & advanced manufacturing; biomaterials; sustainable materials |
| University of Windsor – Mechanical Engineering with Materials Option | Mechanical Engineering with Materials Option (Co-op) | 4-year BASc with specialization option | Machine design, CAD, materials (metals, polymers, composites) for manufacturing |
| Ontario Tech University (Oshawa) – Faculty of Engineering & Applied Science | Manufacturing Engineering | 4-5 year Honours Bachelor | Design and optimize manufacturing systems; materials & composites; automation |
| Ontario Tech University & Trent University (Graduate) | Materials Science (MSc) | Graduate level | Focus on nanomaterials, surface science, biomaterials, and advanced research |