



Course Title: Plastic Injection Molding Technology

Course Length: 3 days, in-person

Time in Class per day (hours): 4.5 hours of in-person instruction, 2 hours of labs

Labs: 3 (see below for lab descriptions)

Delivery Options: Company site or at provider

Class Size: Minimum 8 / Maximum 15

Price Per Student:

- Onsite for one company: \$6,440.00
- Open Enrollment, PPS: \$875.00

Location: Wayne County *or* Company Site

Course Description:

This course provides an understanding of the injection molding process. Participants will learn about the injection molding process including components, injection molding equipment, process troubleshooting, part design, tool design, plastic materials, part cost analysis, and material handling. This course is ideal for experienced engineers and technicians who need to understand the application of plastics in their respective areas. Emphasis is placed upon case studies and experiences directly tied to the automotive and mobility industries. A pre-test and post-test assessment will be administered to attendees. A summary will be provided to all participants. Lab and other assignments and projects will be reviewed by the instructor and certificates will be provided to those who have successfully reached a general score of 75% on the full course assignments based upon the post-test. Projects will be reviewed and results submitted per the RFP. Additionally, attendees will evaluate the class, content and instructor at the end of the class.

Course Learning Objectives:

- Distinguish the major components of the injection molding process.
- Investigate drying materials and plasticating methods used for plastic materials that are processed into injection molded parts.
- Identify the components of injection molding tooling.
- Demonstrate the ability to apply basic design principles for manufacturing injection molded parts.
- Explore the different plastic materials and their properties used in injection molding.
- Correct typical molding problems in injection molding by applying standard troubleshooting methods.
- Describe the methods used in costing injection molded parts.
- Adhere to plastics injection molding industry safety guidelines.
- Practice concepts in laboratory settings.



## Course Content/Syllabus:

### Injection molding and its history

- Where did injection molding begin
- Moving the material
- The machine and melting the plastic

### Plasticating systems: How do you melt the plastic?

- Injection molding screw design
- Heating the material: The role of the heater band
- Material shear in the barrel

### Moving the material to the mold.

- The sprue
- The runner
- Gate design

### Plastic tooling: What comprises the injection mold

- Type of molds: Hot vs. cold runner
- The mold base: two vs. three plate
- Components of the typical injection mold
  - The ejector pin
  - Sprue bushing
  - The mold cavity
  - The mold core

### Plastic materials for injection molding.

- Thermoplastics & thermosets: Advantages, limitations & applications
- Advanced plastic materials: Advantages, limitations & applications
- Manufacturers & tradenames of plastic materials

### Basic plastic part design: How to design a plastic part.

- The importance of nominal wall thickness
- Designing for projections: Ribs, bosses and gussets
- The phenomenon of mold shrinkage

### Cost analysis and impact of an injection molded part.

- Typical resin costs
- Calculating cost of a part in terms of part weight
- Effect of cycle time on part costs

### Troubleshooting the injection molded process and scrap management.

- Description of typical molding problems and examples of each
- Problem solving these typical injection molding problems
- Problems include: Splay marks, short shots, burn marks, flashing, barrel to shot ratio, etc.



### Labs:

Our manufacturing and technology programs integrate the leading computer technology with state-of-the-art labs and an emphasis on quality and workforce readiness to give participants a real-world focus on the ever-changing manufacturing process. Our state-of-the-art plastic technology laboratory consists of a 110-ton Krauss-Maffei injection-molding machine.

Participants will be able to:

- Review and identify the components of the injection molding machine.
- Explore machine start-up and control process.
- Troubleshoot the injection molding process.

MAGMA short courses are held on a rolling basis, based on industry demand. Please complete this [short form](#) to express interest for yourself, or your organization.