

COLLEGE OF THE  
EXTENDED UNIVERSITY

EXTENDING BOUNDARIES THROUGH EDUCATION AND INNOVATION

## CAL POLY POMONA

### PLASTICS ENGINEERING TECHNOLOGY CERTIFICATE PROGRAM

#### PLASTICS 101 – THEORY AND PRACTICE

Winter

This course is designed to introduce students to basic concepts and techniques used throughout the plastics industry. The objective is to expose everyone to the fundamentals of Plastics, product design, basic processing techniques, secondary operations and tooling. The Attendees will be given hand outs showing *How* and *Where* to get more detailed information on variety of Plastics related topics. This course should be valuable to all technical, scientific and engineering personnel, either entering field of plastics or interested in broadening their knowledge of materials and processing techniques. It is also suitable for individuals in plastics sales, marketing, purchasing, and quality assurance.

#### CONTENT

Plastics Industry Overview, History, Growth, Future

Polymer Chemistry Basics

Polymer Structure-Properties-Applications

Modified Plastics-Alloys-Composites

Elastomers

Product Design Basics

Material Selection Process & Interpreting material data sheets

Plastics Identification Techniques

Processing Techniques

Plastics Tooling

Decorating and Printing

Assembling and Secondary Operations

Part Costing

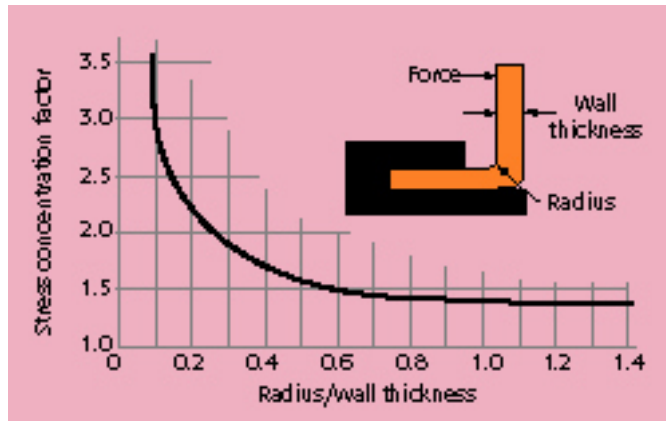
Testing and Failure Analysis

Plastics Industry Standards and Organizations

Recycling

Educations and Seminars

Where to get more information.....

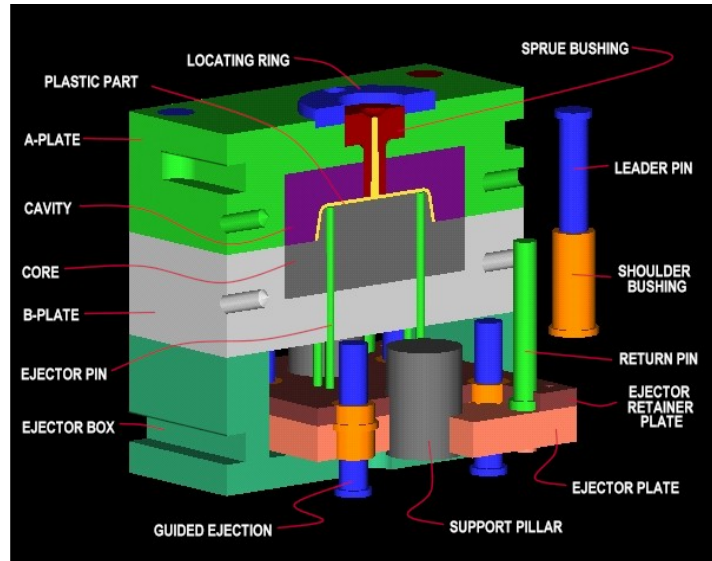


## **PLASTICS PRODUCT DESIGN FOR INJECTION MOLDING      Spring**

This course provides an overview of the design process for injection molded plastics parts. The emphasis is on concurrent engineering practices, which leads to elimination of barriers between various engineering groups, toolmaker and manufacturer. The student will learn about importance of proper material selection, part design fundamentals, manufacturing (moldability) considerations, design for assembly, tooling considerations, rapid prototyping techniques and testing. Students are encouraged to share their knowledge of product design success/failure stories in a group discussion format. Design fundamentals discussed are applicable to parts designed for all plastics processing techniques.

### **CONTENT**

**Polymer Chemistry Basics and Material Selection Process**  
**Plastics Material Identification Techniques**  
**Concurrent Engineering, Plastics Part Design Process overview**  
**Manufacturing Considerations – Design For Molding I**  
**Manufacturing Considerations – Design For Molding II**  
**Basic Part Design I**  
**Basic Part Design II**  
**Basic Part Design III**  
**Prototyping and Testing**  
**Design For Assembly and review of assembly techniques**  
**Tooling Considerations**



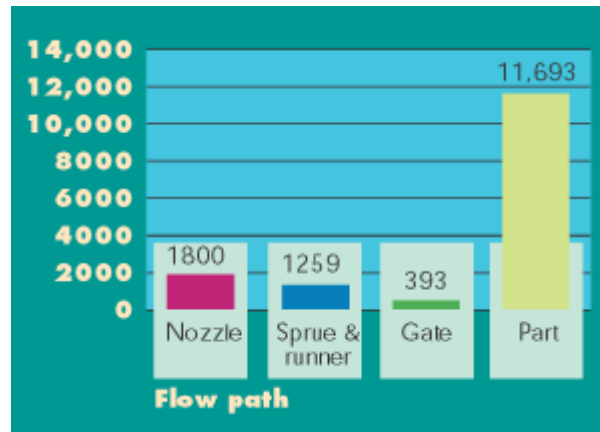
## **TOOLING FOR INJECTION MOLDING**

**Spring**

The course is designed for toolmakers, apprentice, technicians, product designers, process engineers and other plastics personnel desiring to acquire basic knowledge of tooling technology. The emphasis is on understanding of materials, flow properties, injection molding process, mold material selection, various mold components, mold design principles, cooling, venting, draft considerations, shrinkage, mold polishing, and tool surface enhancements techniques. Topics such as use of simulation software to enhance mold design, how to improve productivity, reduce down time, and lower maintenance costs by optimizing tooling design will be covered in detail. The class will tour a local modern tool making facility.

### **CONTENT**

- Polymer Chemistry - Plastics materials**
- Injection Molding process**
- Injection Molds (Types of mold construction)**
- Tooling Considerations I**
  - Mold Metallurgy, Runners, Gates, Sprue bushing, Sprue pullers**
- Tour.....Local Tool making facility**
- Mold Design and Simulation software**
- Tooling Considerations II**
  - Venting, cooling**
- Tooling Considerations III**
  - Draft angles, Shrinkage, Mold polishing, Tool surface enhancement**
- Hot Runner Molds and Systems**
- Rapid Tooling and Prototyping**



## **SCIENTIFIC INJECTION MOLDING**

**Fall**

The course emphasis is on scientific approach to a somewhat complex injection molding process in order to simplify and eliminate basic misunderstanding about processing techniques employed today throughout the industry. The student will learn importance of understanding polymer basics, material flow properties, and viscosity-shear rate curve, major plastics variables in molding, decoupled molding techniques, data analysis and interpretation. The course will cover fundamental and scientific approach to material drying, venting, cooling, use of regrind, how to prepare universal set up sheet, cycle time optimization, tooling considerations, etc. Use of modern tools and techniques such as mold flow analysis, cavity pressure transducers, and data acquisition tools along with troubleshooting techniques will also be covered.

### **CONTENT**

Polymer basics, Plastics materials and flow characteristics  
 Part design fundamentals  
 Overview of basic injection molding process  
 Drying, material mixing, coloring, regrind usage  
 Major process variables  
 Decoupled molding, universal set up sheet  
 Tooling considerations, venting, cooling, ejection  
 Cycle time optimization and troubleshooting techniques  
 Mold flow analysis  
 Tricks to improve productivity  
 Modern injection molding operation

**INSTRUCTOR: VISHU SHAH      CONSULTEK      714-674-1981**

For more information, please visit: [www.ceu.csupomona.edu](http://www.ceu.csupomona.edu) or call the College of the Extended University at (909) 869-2288

