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……
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
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
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

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