

19MSPS301 SCIENCE OF POLYMER PROCSSING

Unit I: Introduction

Introduction to polymer processing – selection of correct grade of polymers – suitable MFI, K-value – suitable additives - master batch – powder concentrate - Processing techniques for thermoplastics – plastication and fusion mechanism of thermoplastics – homogeneous melts.

Unit II: Processing of Thermoplastics

Processing Techniques for thermoplastics - injection moulding –terminology – Process description- Theory of injection moulding –moulding cycle - Blow moulding – terminology – Basis in blow moulding - Process variables – Injection & stretch blow moulding- Extrusion – Principle – Types of Extruders – Single screw and twin-screw extruders- compression and transfer moulding- rotational moulding – Thermoforming.

Unit III: Processing of Thermosets

Pre-polymers – curing agents and hardeners – other additives - processing techniques of thermosetting plastics – hand layup – spray up – filament winding – pulltrusion – compression and transfer moulding - resin transfer moulding - SMC & DMC.

Unit IV: Processing of Rubbers & Fibres

Mastication of rubber – additives for rubber – vulcanization -compression moulded rubber products – foot wear, seals, O -ring - extrusion – tyre, hose, and conveyor belts – Latex products – gloves, condom, rubber band, elastics thread, and foam.

Fibre spinning process - Dry spinning and wet spinning of fibers- Fiber drawing, heat setting, texturing, Spun bonding and melt-blowing processes - brief idea about auxiliary plants and Equipment. General principles of finishing and dyeing of fibers.

Text Books:

1. Plastics: Materials & Processing : Strong A Brent (Pearson Prentice Hall)
2. Injection Moulding: Theory and Practice: Rubin, Irvin (Wiley)
3. Handbook of Plastic Technology, Plastic Processing Operations
Allen, CBS Publishers

References:

1. Plastics Engineering Handbook Ed. 5 : M.L.Berins (Society of Plastics Industry Inc)
2. Plastics Engineering: R.J.Crawford et.al.(Elsevier Butterworth- Heinmann)
3. Blow moulding : Norman Lee (Hanser)