Gautam Buddha University; Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech.	Plastic Technology	MEM 525	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
I	3	3-0-0	3 Hours

Unit I

Polymer Science: Introduction to monomer and polymer; Intermolecular forces; Chemical bonding; Polymerization; Polymerization techniques and mechanism; molecular weight; Molecular distribution; Effect of molecular weight on processing and properties; Nomenclature; Sources of raw material; Methods of polymerization; General properties; Processing behavior and end use applications of the following : Natural polymers; Shellac; Casine. **(07 Hours)**

Unit II

Additives : Fillers; Antioxidants; Thermal stabilizers; Lubricants; Plasticizers; Toughening agents; Colorants; Fire retardants; Coupling agents; Blowing agents; Ultraviolet stabilizers; Antistatic agents; Ant-blocking agents; Slip and anti-slip agents; Processing aids; Mould releasing agents. **(07 Hours)**

Unit III

Compression & Transfer Molding: Compression molding; Fundamental principles; bulk factor; Flow properties; Processing temperature; Mould temperature control; Molding pressure; Press tonnage ; Processing limitations; Curing time; Influence of processing parameters on the quality of the molding.

Injection Molding: Introduction; Types of injection molding machines; Injection molding machines specifications; Projected area; Plasticizing capacity;

Shot weight; Type of locking systems; Mould clamping; Press tonnage; Influence of processing parameters on the quality of the molding. **(08 Hours)**

Unit IV

Extrusion: Introduction; Extruder parts; Extrusion screw; Design features; Design variables; Extruder output; Extrusion processing parameters; Their effects on product; Extruder faults causes and remedies; Extrusion of film; Pipe; Sheet; Profile and coating - dies for different extrusion process. **(08 Hours)**

Unit V

Blow Molding: Introduction to blow molding; Types of blow molding operations; Extrusion blow molding; Injection blow molding; Stretch blow molding; Types of blow molding machines; Blow mould construction.

Rotational Molding: Introduction to rotational molding; Rotational mould construction. **(08 Hours)**

Unit V

Thermoforming: Introduction; Thermoforming methods; Thermoforming dies thermoforming equipment description.

Advanced Processing Techniques: Reaction injection molding; Structural foam molding; Resin transfer molding. **(07 Hours)**

Recommended Books:

1. Designing Plastic Parts for Assembly; P.A. Tres; Hanser Gardner Publications; 5th edition; 2003
2. Plastic Part Design for Injection Molding: An Introduction; R.A. Malloy; Hanser Gardner Publications; 1994.
3. Joining of Plastics: Handbook for Designers and Engineers; J. Rotheiser Hanser; Gardner Publications; 2004.
4. Successful Injection Molding: Process; Design; and Simulation; J.P. Beaumont; R. Nagel; R. Sherman; Hanser Gardner Publications; 2002.
5. Blow Molding of Plastic; Fisher; Butterworth; 1976.
6. Industrial Plastic: Basic Chemistry; Major Resins; Modern Industrial Process; Baird; Willcox; 1982.
7. Handbook of Plastic Processes; Harper; McGraw Hill Publication; 2006.
8. Selection and Use of Thermo Plastic; Powell; Oxford Press; 1977.