

Plastics Engineering

B.E. Sem. VIII [PROD]

(Elective – I)

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Materials

Definition and classification of polymers. Important plastics materials, their properties, moulding characteristic and applications.

Additives for plastics- need, types, uses and methods of incorporating .

Introduction to plastics blends, alloys and composites. Recycling of plastics and waste management - principles only.

2. Processing

Injection Moulding : Moulding materials, molding cycle-phases and significance. **Moulding Machinery**: Types, construction and design features of injection and clamping units , Technical specifications and selection. **Processing techniques**: Process parameters and their influence on product quality, trouble shooting. **Auxiliary equipment for plastics processing**: Hopper dryers, Deccant dryers, Granulators, mould temperature controllers, Proportionating devices, chilling units, automatic material conveying systems.

Extrusion Process : Constructional and design features of extrusion machinery. Technical specifications and selection.

Extrusion lines for pipes, Films (Monolayer and multilayer, blown and cast films), sheets, Extrusion coating , monofilaments, box strapping , cables/wires and profiles.

(Coverage for the above should include materials, plant layouts, in line equipment, extrusion techniques, process parameter and their influence on extruded products and trouble shooting)

Blow moulding : Materials, types, Machinery, technical specifications and selection.(Extrusion Blow Moulding, Injection blow Moulding. and stretch Blow Moulding)

Processing technique : Process parameters and their influence on product quality, trouble shooting, Comparison between types of BM processes.

Other Process : Brief coverage of the following processes with relevant details like machinery, materials, processing techniques and applications. Thermoset Moulding, Thermoforming, Rotational Moulding, calendaring, fabrication and decorating with plastics.

FRP techniques : Raw materials and ancillaries used , techniques like Hand lay-up, Spray up and filament winding processes, applications.

3. Product designing with plastics

Mechanical behaviour of plastics, creep data and its significance in designing. Product designing tips for designing articles to be manufactured by Injection Moulding , Blow Moulding and Extrusion process.

4. Design of moulds

Compression and transfer moulds : General arrangement of compression moulds - flash, semi positive and positive version. General arrangement of transfer moulds - moulds for integral pot and auxillary transfer.

Injection moulds : General arrangement of two plate moulds. Design of mould components, design of feeding , cooling and ejection systems, three plate moulds, Designing for moulds for articles with undercuts- split moulds and moulds with side cores actuation techniques, moulds for internally threaded articles, fully automatic moulds, mould standardization and innovative mould component, Hot runner systems-General arrangement, Design of manifold blocks, flow ways and nozzles , advantages & limitations.

5. Blow moulds

General arrangement and mould components, design of neck and base pinch offs and flash pockets, Venting of moulds, selection of parting lines.

6. Extrusion dies

Design of extrusion dies for pipes, films, sheets, cables and profiles.

7. Mould Materials of Construction

Characteristics , Tool steels and alloys ,non-ferrous materials.

Reference Books :

1. Moulding of Plastics (*Bickales*)
2. Design of Extrusion dies (*M.V.Joshi*)
3. Injection Mould Design (*R.G.W.Pyre*)
4. Plastic Materials (*Brydson*)
5. Extrusion Technology (*Allen Griff*)
6. Practical guide to Blow Moulding (*Lee*)
7. Injection Moulding: Theory & Practice (*Rubin*)
8. Mould Engineering (*Rees*)
9. Moulded Thermosets: A handbook for plastic Engineers , Moulders & designers.(*Wright*)
10. Handbook of Plastic Processes (*Harper*)
11. Injection Moulds:130 Proven Designs (*Gastrow*)

