DISCIPLINE SPECIFIC CORE COURSE – 11

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical / Practice		
POLYMER PROCESSING TECHNOLOGY	**4**	**2**	**0**	**2**	**Class 12th with Physics, Chemistry, Mathematics**	**---**

Learning objectives

- To learn about the various processing techniques and their components
- To learn the fundamentals of extrusion and different extrusion processes of thermoplastics.

Learning outcomes

After studying this paper, students will be able to

- Explain the significance of the single screw and multiple screw extruder systems
- Apply the fundamentals of injection and compression molding process and interpret processing variables for upgradation of quality of products

SYLLABUS OF DSC- 11

THEORY COMPONENT-

UNIT 1: **(6 Hours)**

EXTRUSION

Extrusion process, the extrusion die, classification of extrusion dies: film and sheet extrusion, multi-layer extrusion, Spider die, Pipe and Tube die, offset die, etc. Die swell and die defects

UNIT 2: **(10 Hours)**

INJECTION & BLOW MOLDING

Principles, material used, injection molding cycle, injection molding machine, some aspects of product quality, reaction injection molding (RIM), blow molding, extrusion blow molding,

injection blow molding, stretch blow molding, blow moulding of PET, trouble shooting operations.

UNIT 3: **(4 Hours)**

THERMOFORMING

Thermoforming process: Principles, materials used, types and applications

UNIT 4: **(4 Hours)**

COMPRESSION & TRANSFER MOLDING

Compression moulding process, transfer moulding process: introduction, material used, types and applications

UNIT 5: **(6 Hours)**

MISCELLANEOUS PROCESSING METHODS

Casting and rotational moulding processes: principles, material used, types and applications
Casting, rotational moulding, machining and joining processes: principles, material used, types and applications

PRACTICAL COMPONENT **(60 Hours)**

- To prepare a polymeric sheet/ specimen by compression molding.
- To prepare polymeric specimens by transfer molding.
- Preparation of polymeric specimens/product by injection molding.
- To process a polymer using extruder and to determine the production rate & residence time
- To prepare polymer film/ membrane by solution casting method.
- To prepare thermo formed polymeric products.
- To cast various products using polyester resin/epoxy resin/latex.
- Industrial/lab visit.

ESSENTIAL/RECOMMENDED READINGS

- Strong A.B., (2005) Plastics: Materials & Processing, Prentice Hall.
- Rosato D.V., Rosato D.V., (2000) Injection Moulding Handbook, CBS Publisher.
- Morton-Jones D.H., (2007) Polymer Processing, Chapman & Hall.
- Griff A. L., (2021) Plastics Extrusion Technology, Creative Media Partners, LLC

- Gogos, C. G., & Tadmor, Z. (2013). Principles of polymer processing. John Wiley & Sons.
- Berins, M. (Ed.). (1991). Plastics engineering handbook of the society of the plastics industry. Springer Science & Business Media.

SUGGESTIVE READINGS

- Chan I. Chung, Hanser Verlag (2000) Extrusion of Polymers: Theory and Practice,
- R. J. Crawford, Rotational Molding of Plastics ABS, Research Studies Press Ltd.
- Crawford R.J., (1998) Plastic Engg, Butterworth-Heinemann.
- J.L. Throne (1987) Thermoforming Hanser Publishers.
- Rosato (1987) Blow Molding Handbook, Hanser Publishers.
- Harper, C. A., & Petrie, E. M. Plastic materials and processes: a concise encyclopedia. 2003.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

DISCIPLINE SPECIFIC CORE COURSE – 12

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
RECYCLING AND WASTE MANAGEMENT	**4**	**2**	**0**	**2**	**Class 12th with Physics, Chemistry, Mathematics**	**NIL**

Learning objectives

- To introduce the concept of life cycle analysis
- To learn about the solid waste management policies
- To learn about various sources of polymer waste generation and their management
- To understand various waste disposal and treatment methods