

## SEMESTER VI

### 1. GLASS TECHNOLOGY

#### Module I (12 hours)

Introduction: Physical and chemical properties, structure of glass, theories on glass formation-structural and kinetic, nucleation and crystal growth, TTT curve, glass forming ability and stability.

Raw materials, compositional nomenclature, handling, batch calculation and preparation, effects of different oxides on glass properties; glass melting reactions, refining and homogenizing; glass melting furnaces, classification of glass making furnaces

#### Module II (8 hours)

Viscosity of glass forming melts: Viscosity, viscoelasticity, viscosity measuring techniques-rotation viscometer, falling sphere viscometer, fiber elongation viscometer, beam bending viscometer.

Specialized forming methods: porous glass, sol-gel processing, vitreous silica products, sealing and solder glasses.

#### Module III (8 hours)

Primary forming operations; pressing, casting, blowing, drawing, rolling etc.

Secondary forming operations; cutting, grinding, processing, surface coating. Manufacturing tolerance and glass design.

#### Module IV (8 hours)

Manufacture of glass fibres, applications. Glass containers, flat glass, laboratory glass wares, sight and gauge glasses, electric lamps and electron tubes. Coloured and laser glasses IR transmitting glasses. Optical fibres.

#### Text and Reference Books:

1. J.E.Shelby, Introduction to Glass Science and Technology, Royal Society of Chemistry
2. J. Zarzycki, Glasses and Amorphous Materials (Materials Science and Technology : A Comprehensive Treatment, Volume- 9), Wiley-VCH