

(4 Lect./Week)  
(4 hrs. Lab/Week)  
(1 Student's presentation /Week)

(Total Credits -7)

## Paper 6: Polymer Additives

1. Importance of additives and their selection criteria for commercial polymers.
2. Additives for plastics and their mechanism of function:
  - a. Stabilizers
  - b. Fillers
  - c. Plasticizers
  - d. Lubricants
  - e. Flame retardants
  - f. Foaming agents
  - g. Cross linking agents
  - h. Metal deactivators
3. Additives for rubbers and their mechanism of function:
  - a. Vulcanizing agents and retardants
  - b. Accelerators
  - c. Activators
  - d. Fillers
  - e. Softeners
  - f. Colors and pigments
  - g. Tackyfing agents
  - h. Blowing agents
  - i. Surface property modifiers
4. Illustration of few formulations and their compounding procedures.

### Practical - Polymer III:

1. Determination of gravity of fillers.
2. Determination of bulk density of fillers.
3. Determination of pore size and net size of fillers.
4. Determination of heat stability of heat stabilizers.
5. Measurement of flash point of plasticizer.
6. Identification of additives.

### Suggested Readings:

1. Polymer Modifiers and Additives, by Lutz, Marcel Dekker (2001).
2. Chemistry and Technology of Polymer Additives, by Al- Malaika, Elsevier Applied Science (1999).
3. Plastic Materials, by J. Brydson, Butterworth-Heinemann (1999).
4. Handbook of Rubber Technology, by Martin and Smith, CBS Publisher (2007).
5. Polymer Science and Technology: Plastic, Rubber Blends and Composites, by P. Ghosh, Tata McGraw Hill (2010).