

## **Technical English for polymer**

### **Undergraduate 2 credit course in Polymer Engineering curriculum**

#### **Amirkabir University of Technology**

**Chapter 1: Polymer science** (Structure of a Polymer, Classification of Polymers, Crystalline and Amorphous Polymers, Thermoplastics and Thermosetting Plastics, Homopolymers and Copolymers, Block/ Graft /Random Copolymer).

**Chapter 2: Printing techniques on polymers**, (Flat printing, Flexography, Gravure Printing, Stencil Printing, Inkjet printing, Three-Dimensional Printing).

**Chapter 3: Fiber Technology** (Morphology, Macrostructure Microstructure, submicroscopic structure, Synthetic Fiber Formation, types of spinning, Drawing and Heat Setting, mechanical and thermal properties).

#### **Chapter 4: Surface modifications of polymers**

**Chapter 4: Plastic technology** (compression molding, Injection molding, blow molding, rotational molding, other processing methods, blowing film and tubing, calendaring, casting, extrusion, forming).

**Chapter 5: Wettability and Super-hydrophobicity of solid surfaces** (Water contact angle, Young theory, Wenzel theory, Cassie-Baxter theory, contact angle hysteresis, Sliding angle).

**Chapter 6: Paint technology** (Composition of Paints, Binders and Resins, Pigments and Extenders, Paint Additives, Solvents, Paint Application, Drying and Film Formation, Physical Drying, Chemical Drying, Multicoat Systems).

**Chapter 7: Chemistry and classification of dyes** (Colorants: dyes / pigments, Synthesis of dyes, The interaction of light and dye).

**Chapter 8: Functional Coatings** (Classification of Coating Properties, Anticorrosive Coatings, Antifouling Coatings, Antibacterial Coatings, High Thermal-Resistant and Fire-Retardant Coatings Self-Cleaning Coatings, Scratch- and Abrasion-Resistant Coatings) .

**Chapter 9: Light and Colour/ Colour mixing and colour specifying systems** ( Perception of colour, The theory of colour vision, The subjective nature of colour vision, Additive/ Subtractive colour mixing, Colour specification and colour specifying systems, The Munsell system, The CIE system, metamerism).

**Chapter 10: Health, safety and environment** (Personal health and safety, Prevention of fire and explosion, Written information on hazards, Protecting the environment by good formulation)

## Chapter 12: Nanotechnology in polymers

## Chapter 13: Resins for surface coating

**Chapter 14: How to write a paper for a scientific journal?** (Writing the manuscript, structure and content of a manuscript).

### References:

1. Izdebska, Joanna, and Sabu Thomas. *Printing on polymers: fundamentals and applications*. William Andrew, 2015.
2. Hatch, Kathryn L. *Textile science*. 1993.
3. Song, Junlong, and Orlando J. Rojas. "Approaching super-hydrophobicity from cellulosic materials: a review." *Nord. Pulp Pap. Res. J* 28.2 (2013): 216-238.
4. Freitag, Werner, and Dieter Stoye, *Paints, coatings and solvents*, Wiley-VCH (1998).
5. Swapan, Kumar Ghosh. Functional coatings by polymer microencapsulation. *Belgium: Wiley-VCH* (2006).
6. Gohl, Erhard Paul Gottlieb, and Leo David Vilensky. *Textile science*. (1983).
7. Kale, Kiran H., and Desai. "Atmospheric pressure plasma treatment of textiles using non-polymerising gases." (2011).
8. Bentley, John, and Gerald Patrick Anthony Turner. *Introduction to paint chemistry and principles of paint technology*. CRC Press, 1997.
9. Mahapatra, N. N. *Textile dyes*. WPI Publishing, 2016.
10. Jenkins, Sue. "How to write a paper for a scientific journal." *South African Journal of Physiotherapy* 53 (1997)