



### **Polymer Technology - Elective Course**

**Khalid Aref, Professor of Chemical Engineering**

**College of Engineering/ Al-Muzahmiyah**

#### **Office Hours**

These are the times I'm scheduled to be in my office. If these times are not convenient for you, please see me to make an appointment for some other time

All working days: 12:00 - 13:00

#### **TextBook**

Textbook of Polymer Science, by F. W. Billmeyer, A wiley-inter science Publication, 3<sup>rd</sup> ed.1984.

#### **Reference:**

1-Principles of Polymer Engineering, by N. G. McCrum, C. P. Buckley and C. B. Bucknall, Oxford Science publications, 1989.

2-Polymers: Chemistry & Physics of modern materials, by J. M. G. Cowie, Published by international Textbook Company Limited, 1973.

#### **Prerequisite**

Successful completion (D or better grade) of Chem 101, General Chemistry.

#### **Grading System**

Midterm exam: 30%

Reports and presentation: 20%

General performance and attendance: 10%

Final exam: 40%

#### **Course Description**

##### **Polymer Technology**

Hours: 2 lectures + lab = 3 credits

Classification of polymeric materials, calculation of molar mass and molar mass distribution, polymerization reactions, polymer processing, mechanical and physical properties, commercial polymer.

### Course Learning Outcomes

#### **By completion of the course, the students should be able to:**

1. **Define** the basic vocabulary of polymer science.
2. **List and explain** the classification of polymeric materials.
3. **Recognize** the different structure of polymeric materials.
4. **Distinguish** between thermoplastics, elastomers and thermosets Polymers.
5. **Explain** the difference between homo and copolymers from engineering point of view.
6. **Apply** the Molar mass distribution.
7. **Calculate** Molar mass averages.
8. **Define** the difference between condensation and addition polymerization reactions.
9. **Define** the term tacticity and its effect on the mechanical properties of polymeric materials.
10. **Explain** effect on the mechanical properties of engineering polymer.
11. **Define** the effect of different polymer matrixes such as thermosets and thermoplastic materials.
12. **Write** and speak with effective communication skills through group work, class participation and in preparation of class projects.
13. **Develop** an expertise in team problem solving

#### **Topic Covered During Class:**

• Polymer Chemistry.	2	week
• Molar mass and degree of polymerization.	2	week
• Classification of polymerization reactions.	1	week
• Polymer structure and properties .	1	week
• Polymers in solution.	2	week
• Solid state polymers.	2	week
• Mechanical properties of polymers.	2	week
• Polymer processing	2	week