

**Department of Materials Science and Engineering  
University of Maryland, College Park, Maryland**

**1. ENMA 495 – Polymeric Engineering Materials**

- 2. Credits and contact hours – 3 credits.** The University of Maryland follows the Maryland Higher Education Commission's policies on "contact hours;" specifically, one semester hour of credit will be awarded for a minimum of 15 hours, of 50 minutes each of actual class time, exclusive of registration, study days, and holidays.

**Schedule:** meets two 75 minute periods per week

- 3. Instructor's or course coordinator's name: Prof. Mohamad Al-Sheikhly**

- 4. Text book, title, author and year:** Essentials of Polymeric Science and Engineering, Paul C. Painter and Michael M. Coleman

**5. Specific course information**

- a. Brief description of the content of the course (catalog description):** Study of polymeric engineering materials and the relationship to structural type. Elasticity, viscoelasticity, anelasticity and plasticity of single and multiphase materials. Emphasis is on polymeric materials.
- b. Pre-requisites or co-requisites:** ENMA 300
- c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program:** ENMA 495 is an elective course for Materials Science and Engineering majors.

**6. Specific goals for the course:**

- a. Specific outcomes of instruction:** The main objectives of this course are to:
  1. Student will understand the basic characteristics of polymers
  2. Students understand the basic synthesis of polymers
  3. Students will understand the basic characterization of polymeric materials.

**b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed in this course.**

ABET A: Ability to apply mathematics, science and engineering principles to design

ABET B: Ability to design and conduct experiments, analyze and interpret data.

ABET E: Ability to identify, formulate and solve engineering problems.

ABET G: Ability to communicate effectively

ABET H: The broad education necessary to understand the impact of engineering solutions in a global and societal context.

ABET I: Recognition of the need for and an ability to engage in life-long learning.

ABET J: Knowledge of contemporary issues.

**7. Brief list of topics to be covered:**

1. Polymer types, molar mass distribution, and molar mass measurements
2. Polymer synthesis and polymerization kinetics
3. Probability and statistics applications in polymer science
4. Synthesis and kinetics of copolymerization
5. Chemical structure and morphology
6. Crystallization, melting and glass transition
7. Polymer solutions and blends
8. Mechanical and Rheological Properties