**COURSE SYLLABUS**

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| **Course Title**：Polymeric Materials |
| **Credits / Hours** | 3/3 | **Course Number** |  | **□Required ■Elective** |
| **Course Description**This course will provide a polymer science and engineering background to material science students. The course is instructed at an intermediate level and provides sufficient information to enable materials engineers to understand the basic principles and behaviors of common polymer and polymer composite systems. This course consists of four parts, including polymer chemistry and physics, polymer synthesis, functional polymer materials and their applications. |
| **Course Topics** |
| **Topic** | **Content** |
| Introduction of Polymer Materials | Types of polymers and their identification and applications. |
| Polymer Chemistry | 1.Polymer bonding, intermolecular attraction, configuration and conformation. 2.Introduction of step-growth polymerization, radical chain polymerization, ionic polymerizations, living polymerization, and ring-opening polymerization. |
| Polymer Physics | 1.The glass transition, structural relaxation, viscoelasticity, time temperature superposition. 2.Thermal properties of polymers. The rheology of polymer melts. |
| Polymer Synthesis | Synthesis of high-performance polymers such as polyamide, polyester, polyester resin, polycarbonate, polyurethane, polyvinyl acetate, polyvinyl alcohol, polyacrylonitrile. |
| Advanced polymeric materials | 1.Structural and functional properties of polymers and polymer composites.2.Preparation of advanced polymer structures, such as block, star and brush copolymers, semi-conducting and biodegradable polymers. |