

**National Chung Cheng University Department of Chemical Engineering Year
2016/Fall**

Course Syllabus

Course Title	Light Scattering Analysis of Complex Fluids	Course Number	4257760
Instructor	Chi-Chung Hua, Professor Engineering Building II, Room 412 Ext. 33412 Email: chmcch@ccu.edu.tw		
Credit Hours	3	Course Classification	Selective: for senior undergraduate students and above
Course Schedule/ Classroom	Friday 8:45-11:30, Engineering Building II, Room 203		
Prerequisites	Physical Chemistry/Engineering Mathematics		
Course Description	I. Introduction to the basic principles of light scattering technique II. Analyzing schemes for polymer/colloid solutions and gels III. Case studies and project reports.		
Course Objectives	This course introduces the basic principles and schemes for utilizing laser light scattering techniques to resolve the dynamic and structural properties of complex fluid systems, in particular polymer solutions and colloidal suspensions.		
Textbook and References	Berne B. J. and Pecora R. <i>Dynamic Light Scattering: With Applications to Chemistry, Biology and Physics</i> , Dover (2000) Roe R. J. <i>Methods of X-Ray and Neutron Scattering in Polymer Science</i> , Oxford (2000) TERAOKA I. <i>Polymer Solutions: An Introduction to Physical Properties</i> , Wiley (2002) Wolfgang S. <i>Light Scattering from Polymer Solutions and Nanoparticle Dispersions</i> , Springer (2007)		

Course Outline		Teaching Time Allocated (week)
Topics	Contents	1
Introduction	Introduction	
Basics of Laser Light Scattering	1. Instruments 2. Data Acquisition and Retrieval	2
Dynamic Light Scattering	1. Intensity and Field Autocorrelations 2. Modes Retrieving Schemes 3. Diffusivity and Hydrodynamic Radius 4. Polydispersity	3
Static Light Scattering	1. Concentration Fluctuations & Spatial Correlations 2. Form Factor Analysis 3. Structure Factor Analysis	3
Application to Complex Fluids: Case Study	1. Dilute Polymer/Colloid Solutions 2. Concentrated Solutions 3. Gels	3
Mini Projects	1. Projects on Pre-Selected Topics 2. Presentations and Discussion	3

Grading:

- Mid-term exam : 30 %
- Final exam : 30 %
- Oral presentation : 40 %