**Global Learning Initiatives Program Course Syllabus**

Please complete the following form in English. The information will be updated to the Global Learning Initiatives Program website for students’ reference. If you will be offering more than one course, please fill out one form per course offered. Examples in grey.

**Course Information**

|  |  |
| --- | --- |
| Course Name  \*provide the **English** course name of the course. | Polymer Physics |
| Lecturer(s)  \*provide the lecturers’ **English** name. If there are more than one lecturer, please indicate all lecturers in the column. | Cheng-Yu Wang |
| Course Description  \*briefly describe the contents covered in the courses. | Mechanics: The mechanical behavior of polymers, emphasizing  failure, fracture, and fatigure  Introduction: The necessary concepts from a first course on polymers are summarized, the conformations of single polymer chains are treated  Thermodynamics: The thermodynamics of polymer solutions and melts, including the conformations of chains in those states  Bulk States: amorphous and crystalline, the glass transition phenomenon, and rubber elasticity  Dynamics: explains the essential aspects of how polymers move in both melt and solution states |
| Course Objectives  \*list out knowledge or skills students should acquire upon completion of course. | At the end of the course, students are expected to  •Understand the basic physical and chemical properties of polymers  •Understand the thermodynamics and dynamics of polymers  •Apply the knowledge to their own research in the real cases |
| Suggested Proficiencies  (if any)  \*list preferred knowledge or skills students should have before taking the course. | N/A |
| Reading List  (if any)  \*list out the textbooks, references, or other reading materials. | No required textbooks, but we have optional textbooks listed below:  [1] M. Rubinstein, R.H. Colby, Polymer Physics, OUP Oxford, 2003.  [2] L.H. Sperling, Introduction to Physical Polymer Science, Wiley, 2015. |
| Grading Criteria  \*how would the students be assessed during the course. | Attendance and random quiz: 30%  Midterm exam: 35%  Final exam: 35%  (may be modified) |

**Course Schedule**

Please complete the following table with the dates and expected course topics. If there are more than one lecturers instructing the course, please also indicate the lecturer for each class.

|  |  |  |  |
| --- | --- | --- | --- |
| Class | Date (YYYY/MM/DD) | Course Topic | Lecturer |
| 1 | 2020/3/4 | Introduction | Cheng-Yu Wang |
| 2 | 2020/3/11 | Confirmation: Ideal Chain | Cheng-Yu Wang |
| 3 | 2020/3/18 | Confirmation: Real Chain | Cheng-Yu Wang |
| 4 | 2020/3/25 | Thermodynamics of mixing: dilute solution | Cheng-Yu Wang |
| 5 | 2020/4/1 | Thermodynamics of mixing: concentrated solution | Cheng-Yu Wang |
| 6 | 2020/4/8 | Bulk state: amorphous | Cheng-Yu Wang |
| 7 | 2020/4/15 | Bulk state: crystalline | Cheng-Yu Wang |
| 8 | 2020/4/22 | Bulk state: liquid crystalline | Cheng-Yu Wang |
| 9 | 2020/4/29 | Network and gelation | Cheng-Yu Wang |
| 10 | 2020/5/6 | Glass-rubber transition | Cheng-Yu Wang |
| 11 | 2020/5/13 | elasticity | Cheng-Yu Wang |
| 12 | 2020/5/27 | viscoelasticity | Cheng-Yu Wang |
| 13 | 2020/6/3 | mechanical | Cheng-Yu Wang |
| 14 | 2020/6/10 | Project II&III | Abbey Ren, Shi-Ling Ho |
| 15 | 2020/6/17 | Make-up Class | Abbey Ren, Shi-Ling Ho |