Syllabus MAT305 – Fall 2020-2021

- Lecturer

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Phone:9877

- Course Meeting Times;

2 Sessions/week;  
Monday 1h 10:40 am - 11.30 pm  
Wednesday 2h 14:40 am - 15.30 pm

- Office Hours

Two office hours per week is scheduled; additionally, on-demand office hours will be scheduled according to student requests.

2 Sessions/week;  
Monday 1h 11:40 am - 12.30 pm  
Wednesday 2h 16:40 am - 17.30 pm

- Course Objectives

- To give an understanding of polymer chemistry, science and engineering: the relationship between monomer/polymer structure and properties; the rheology of polymers and its importance for processing.
- To provide the importance of molecular structure, molecular weight, crystallinity, molecular orientation, and crosslinking
- To describe elastic properties of polymers; to obtain stress-strain characteristics from elasticity; to evaluate polymer behavior below and above Tg.
- Explain the importance of viscoelastic behavior of polymers; temperature dependence, processing properties, and parameters to quantify viscoelasticity.
- To evaluate selection criteria of polymer properties in engineering use
- To estimate failure behaviors polymers; elastic/plastic yield and fracture, crazing.
- To develop strategies to reinforce plastics.
• Calendar;

<table>
<thead>
<tr>
<th>Week #</th>
<th>1h Lecture</th>
<th>2h Lecture</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.Oct</td>
<td>7.Oct</td>
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<tr>
<td>5</td>
<td>2.Nov</td>
<td>4.Nov</td>
<td>Homework#2</td>
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<tr>
<td>8</td>
<td>23.Nov</td>
<td>25.Nov</td>
<td>Exam#3</td>
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<td>9</td>
<td>30.Nov</td>
<td>2-Dec</td>
<td>Homework#4</td>
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<td>10</td>
<td>7.Dec</td>
<td>9.Dec</td>
<td>Exam#4</td>
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• Lectures;

**Week#** | **Topics to be covered**
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1 | Introduction, Overview of Polymeric Materials
2 | Polymer Synthesis
3 | Structure of the molecule
   Tacticity, Molecular Weight
   Crosslinking
4 | Structure of the polymeric solids
   Crystallinity, Glass Transition Temperature
   Molecular Orientation
5 | Chain Conformation
   Gaussian Chain
6 | Elastic properties of rubber
   Mechanics of Elastomers
7 | Elasticity of a network
   Stress-Strain relationship, Engineering Rubbers
8 | Viscoelasticity
   Creep
9 | Stress Relaxation
   Dynamic Response/Properties
10 | Theory of linear viscoelasticity
   Maxwell Models
11 | Zener Model
   Relaxation and temperature dependence
12 | Polymer Selection: Stiffness
   Stress Analysis
13 | Effect of Temperature
   Yield and fracture
   Yielding
14 | Crazing
   Fracture mechanics
   Fracture properties of polymers
• **Textbooks;**

  • Principles of Polymer Engineering 2E, N. G. McCrum, C. P. Buckley, C. B. Bucknall
  • Fundamentals of Polymer Engineering, Arie Ram
  • G. Odian, Principles of Polymerization, Wiley-Interscience

• **Grading**

  We won’t have midterm or final examinations; instead, all of your grades will come from the short exams and assignments. I will consider five of your exams/assignments and exclude the one with the lowest grade or the missing exam. There won’t be a makeup exam, so you should consider 6th exam or assignment as the make-up. Attendance will be quite important. Assignments will include one or two questions/tasks and you will have one week to return back. Exams will be delivered online (SUCourse+) with one or two questions and it will be always held on the second hour of the Wednesday class, you will have 30 minutes.

<table>
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<tr>
<th>Activities</th>
<th>Percentages</th>
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<tbody>
<tr>
<td>5 out of 6-Exams</td>
<td>75 %</td>
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<tr>
<td>5 out of 6-Assignments</td>
<td>25 %</td>
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• **Attendance**

  Students are expected to attend at least 70% of the classes. 28h out 40h (2h is missing due to the national holiday).
• **Appendix 1: Course Catalogue Information**


3.000 Credit hours

**Levels:** Undeclared, Doctorate, Masters, Exchange - Erasmus Mundus DR, Exchange - Erasmus Mundus MA, Exchange - Erasmus Mundus UG, Special, Scientific Preparatory, Undergraduate, Exchange - Socrates Erasmus DR, Exchange - Socrates Erasmus MA, Exchange - Socrates Erasmus UG

**Faculty:** Course Offered by FENS
Appendix 2: ACADEMIC INTEGRITY AT SABANCI UNIVERSITY

Investigation procedures for academic integrity violations:

Violations of academic integrity include cheating in classroom examinations, plagiarism in take-home examinations, homework assignments, essays, thesis and artistic work, fabrication and misrepresentation of facts and data, as well as assistance to others in commission of these acts, spontaneous or premeditated. These violations undermine values of fairness, honesty and trust in the academic environment and distort the process by which knowledge is shared and evaluated. The academic integrity investigation procedure is a fundamental component of our commitment to maintain a productive climate of learning and a vibrant academic life.

A student whose work or behavior is considered to have contravened the principles of academic integrity faces academic consequences. These are determined by the course instructor or the thesis supervisor in accordance with our academic norms. **The academic integrity policy for each course is appended to the syllabus and announced to the students at the beginning of the course.**

The disciplinary procedure outlined below is independent from the academic consequences of the violation.

1. The students, teaching assistants and proctors in a learning module or course must communicate any information and observation about academic integrity violations to the main instructor.
2. The main instructor personally reports all incidences with preponderance of evidence for violations of academic integrity, **without exceptions**, to the Dean or the Director's office. The report consists of a written statement of facts and evidence. The case is recorded. Please use the attached form.
3. If necessary, the Dean/Director interviews the parties involved and decides on whether to initiate further disciplinary investigation.
4. Further disciplinary investigation is carried out according to the regular procedures of the university.

**The duty to report violations, highlighted in the above procedure, is inseparable from our responsibility to take action against wrongdoing, even in situations involving peer pressure, fear or compassion.** The requirement that all cases be reported to the Dean/Director's office ensures fairness through a uniform application of rules across all cases. It also strongly signals our community's determination to defend the academic values of honesty and mutual trust.