

**Industrial Technology Area
California Polytechnic State University
San Luis Obispo**

***Schedule a 20 minute appointment via zimbra calendar invite**

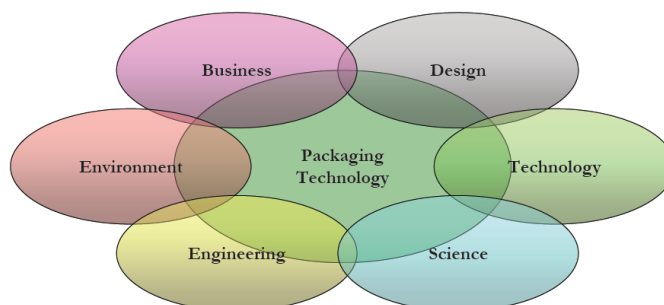
LAB: Wed: 1:10-4:00pm, 21-009
 Thr: 12:10-3:00pm, 21-009
 Fri: 9:10- 12:00pm, 21-009
 12:10-3:00pm, 21-009

Reading Sources: *Required Text:* None
 Recommended Text: **Plastics Packaging**, 2nd Edition – Susan Selke, John Cutler and Ruben Hernandez, ISBN 1-56990-373-7
 Assigned readings may be expected from other sources
 Instructor's notes/PowerPoint slides: Handed out in class/posted on Poly Learn.

"Packaging is the science, art and technology of protecting products from the overt and inherent adverse effects of the environment. Packaging is the integration of elements of materials, machinery and people to erect and maintain barriers between the product and those external forces inexorably seeking to revert the contents back to their essential components. The package is the physical entity that functions as the wall between the contents and the exterior."

The Wiley Encyclopedia of Packaging Technology, Second Edition

Packaging is an interdisciplinary science and involves business, design, technology, science, engineering, and the environmental areas. The packaging industry divides into various material streams – with each sector utilizing different methods and technologies. These material streams include aluminum, metal, glass, paper & paperboard, plastics and timber. Packaging is the world’s third largest industry with expenditures in the U.S. exceeding \$140 billion and \$430 billion worldwide.



The Discipline of Packaging Technology

Catalog Description

Cultural, social and economic implications of plastics in a worldwide environment. Study of materials, costs, processes, resource management, recycling, safety, laws and regulations. Applied laboratory experiences with common industry processes. Application of laboratory experiences to improve consumer conformance to specifications and economic analysis of raw material cost and availability. Evaluation of current materials and technologies to reduce waste and improve reuse and recycling plastics. Required field trips to packaging operations. 3 lectures, 1 Laboratory.

Prerequisite: : Junior standing and completion of GE Area B3 via Chemistry or consent of instructor.

Learning Objectives for the Course

LO1: Students will develop a fundamental understanding of polymer chemistry and resin sources while applying mathematical and scientific principles to plastics processes(material formulations, calculations, mixing of chemicals, etc.) Outcomes will be measured through objective testing and lab experiments.

LO2: Students will gain an understanding of economic factors pertaining to cost, materials, processes, and products in an international environment. Outcomes will be measured through objective testing and class project.

Student Performance Evaluation

Student performance evaluation will be based on exams, lab reports, and a class project. The following describes each of these:

1. **Lab Activities:** require the students to work in teams to perform commonly practiced industry processes and analytical methods.
2. **Class Project:** Student teams (same as those formed for the labs) will participate in a class project where students will be required to improve upon an existing primary package for a product of their choice. Student teams will provide a report and presentation of their class project. (See details on Poly Learn)
3. **Exams:** There will be three exams. Exams will cover the material presented in lectures, handouts or reading materials provided during class, and lab assignments.
4. **Grading:** Final grades will be based on the following:

Midterm I	20%	Thursday, April 24 th
Midterm II	20%	Thursday, May 15 th
Final Exam	20%	IT 341-01: 8:10-10:00am, Tuesday, June 10 th IT 341-04: 4:10-6:00pm, Tuesday, June 10 th
Class Project	20%	Presentations: Tuesday, June 3 rd & Thursday June 5 th
Lab Activities	20%	
Total	100%	

5. **Final Grade:**

The final grade will be composed of a weighted average (based on the weights indicated above) of exams, homework/lab reports and class project. The following is a typical description of letter grade awards:

100-93 A	89-87 B+	79-77 C+	69-67 D+	59 - F
92-90 A-	86-83 B	76-73 C	66-63 D	
	82-80 B-	72-70 C-	62-60 D-	

Lecture Outline

Regulatory and environmental considerations will be interwoven where appropriate throughout the course

Chapter	Tentative Topic Outline	Week
1	Introduction to Plastics	1-3
2	Polymer Structure	
<i>Guest Lecture</i>	<i>Dr. Amro El Badawy- Nanotechnology for Packaging : April 22nd</i>	
3	Major Packaging Polymers	4-6
4	Extrusion and Flexible Material	
5	Thermoforming	
6	Permeability and Shelf-life	
7	Injection Molding	7-9
8	Blow Molding	

Course Policies

- Lectures will be posted as PowerPoint presentations on Poly Learn by 6 pm the day before the class.
- I recommend that you download the lectures and briefly read through them before bringing them to the class.
- Do not miss any lecture. If unavoidable for any reason, I need to know in advance
- There will be no make up exams (except for dire circumstances)
- If you have any dispute over your grade, it needs to be resolved within 7 days of receiving them.
- Any assignment/homework must be turned in by the due date to avoid any penalties. A late assignment/home work may be turned in within 24 hours after due date for a maximum 75% credit.
- The lecture outline is tentative and may be changed for special circumstances like a guest lecture, case study, video presentation, etc.
- I am a very easy going person, please feel free to approach me for any problems or enquiries on any topic (even if outside of coursework)
- If you have a question that I can't answer right away, please have patience and I will do my best to have an answer for you at a later date/time
- **Refrain from using cell phones and accessing social media on your laptop during class time. You will be warned for your first offence, the second offence you will be penalized a percent point towards your total grade.**

What students can expect from me:

- I will explain the course objectives and structure carefully
- I will do my best to explain the course material clearly and precisely
- I will be available for discussions with students individually or as a group during office hours, by phone or by email
- I will encourage participation and try to make the class dynamic
- I will construct fair but challenging exams
- I will grade the exams and assignments fairly
- I will encourage questions from every student without the fear of embarrassment
- I will provide opportunities for the students to help improve the class and lab activities through suggestions during or outside of the classroom

Lecture Format

An active learning format will be followed in this course. Instead of spending the entire class time on traditional lecturing, case studies and group discussions will also be included. The students will discuss problems on the topic(s) covered in the previous lecture during the next class period.

Students with Special Needs

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both me and the Disability Resource Center (DRC), Building 124, Room 119, (805)756-1395 or email drc@calpoly.edu as early as possible in the quarter.

Honesty Statement

Declaration: By registering and taking this course, the student officially enrolled hereby declares that this same student will be the author of all work submitted for the course. Allowing another individual to complete assignments constitutes fraud and academic dishonesty. Finding material from internet or other sources and presenting it as original is also dishonest. All forms of academic dishonesty, including cheating, plagiarism, and falsification of academic records are subject to disciplinary action. Should such behavior come to the attention of the instructor, the student will be dropped from the course or receive a grade of "F."

Code of Conduct

Improper academic conduct shall be interpreted to mean the obtaining and using of information during an examination by means other than those permitted by the instructor, including supplying such information to other students. All forms of academic dishonesty, including cheating, plagiarism, and falsification of academic records are subject to disciplinary action.

Student Privacy (FERPA)

If you have chosen to protect your Directory Information (which includes name and email), it is important you communicate this to your instructor prior to or on the first day of class. This course uses Blackboard tools that will display students' full names and email addresses.