

**DEPARTMENT OF CHEMICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI**

**CL 623 – Polymer Science and Technology (3-0-0 = 6)
July-December (2023) Semester**

Instructors

Vimal Katiyar, Department of Chemical Engineering, vkatiyar@iitg.ac.in, Ph: 258 2278/2082/3550

Class Time

Wednesday 12:00-12:55, Lecture Hall

Office Hours

Monday between 4:00–5:00 PM you can clarify your doubts at our offices. Otherwise, in case you wish to meet urgently please send email to ensure availability and then come.

Use of Email & Moodle Account

In general, announcements, schedule reminders and course material updates will be uploaded to Moodle account of Polymer Science and Technology course and in urgent basis information will be sending via institute email account. If you wish to receive this information at a different email account, send us an email request from such alternate account.

Course Objectives

This course is designed to introduce several concepts of Polymer Science and Technology in general area of Polymer physics, Polymer chemistry, Polymer Thermodynamics, Characterization, Polymer processing and its applications.

Course contents:

Classification of polymers; polymer structure; molecular weight; chemical structure and thermal transition; synthesis of polymers; polymerization mechanism and techniques; phase behaviour, thermodynamics and molecular weight determination; solid state properties of polymers; viscoelasticity and rubber elasticity; degradation, stability and environmental issues; polymer additives, blends, composites, thermoplastics, fibres, elastomers, thermosets, and specialty polymers; polymer processing, rheology and analysis using non-Newtonian fluid model; applications of polymers in separations

Expected Outcome

Upon successful completion of this course you should be able to apply knowledge gained in polymer course for solving various engineering, technological and research problems.

Textbook(s):

1. P. J. Flory, *Principles of polymer chemistry*, Asian Books, 2006
2. M. Rubinstein and R. H. Colby, *Polymer physics*, Oxford University Press, USA, 2003
3. N. K. Petchers, R. K. Gupta, and A. Kumar, *Fundamentals Of Polymer Engineering*, 2nd Ed., Marcel Dekker, 2003.
4. J. R. Fried, *Polymer Science & Technology*, Prentice Hall of India, 2nd Ed., 2009.
5. F. W. Billmeyer (Jr.), *Text Book of Polymer Science*, 3rd Ed., John Wiley & Sons, 2002.
6. P. Bahadur and N. V. Sastry, *Principles of Polymer Science*, Narosa Publishing House, 2002
7. V. R. Gowariker, N. V. Viswanathan and J. Sreedhar, *Polymer science*, New Age International (P) Ltd., 2001
8. Young R. J. & Lovell P.A. *Introduction to Polymers*, Champman & Hall 2nd Ed., reprinted 1994.
9. M. Doi & S. F. Edwards, *The Theory of Polymer Dynamics*, Clarendon Press, 1986.
10. Manas Chanda 'Introduction to Polymer Science and Chemistry: A Problem Solving Approach' Tolyor & Fransic, CRC group. 2006.

Course Policies

- Attendance: The institute policies on attendance should be followed. If you miss a class, you will be responsible for the covered material in that class. Missing a class cannot be an excuse if you fail to meet a deadline.
- Notes: As textbook will not be the only resource for instructional material used, knowledge from research article will be discussed.

Examinations

- Two quizzes, mid-semester and end semester examination will be close book.
- Mid and End-semester Examinations: These will be comprehensive in nature (all covered material) and should be taken according to the schedule of the institute.

Final Grade

Final score in the course is calculated using the following weights and an appropriate grade is awarded.

Home Assignments/Quiz:	20%
Term Report presentation	20%
Mid-semester examination:	30%
Final examination:	30%

Good luck and sincerely hope that we will have lot of fun learning an exciting area together.

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