

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CHEMICAL TECHNOLOGY (36) RUBBER CHEMISTRY & NATURAL POLYMERS SUBJECT CODE: 2143602 B.E. 4<sup>th</sup> SEMESTER

**Type of Course:** Chemical Technology

**Prerequisite:** Student should know the basics of polymers and polymerization. Studied subject PR-01 (Polymer Chemistry).

**Rationale:** The main objective of this subject is to provide the knowledge about the different natural polymers and their chemistry. It also delivers the knowledge about latex obtained from rubber trees and how it is converted into the natural rubber.

### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
				PA	ALA	ESE	OEP			
4	0	0	4	70	20	10	0	0	0	100

### Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Chemistry of Natural rubber, latex collection & purification, Chemistry of other important rubbers such as Neoprene, Butyl rubber, Nitrile rubber, Synthetic rubbers, & elastomers. Vulcanization of rubber.	14	30
2	Chemistry of natural polymers such as cellulose, starch, lignin, Chitin, Chitosan, proteins etc. The modification of natural polymers & rubbers.	14	30
3	Natural material based polymers and resins such as polyesters, polyamides, polyester amides, polylactic acid	10	20
4	Chemistry of epoxy resin, alkyd resin, unsaturated and saturated polyesterresin, amino resins	10	20

### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
60	10	10	10	10

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table

### Reference Books:

- 1) Principles of Polymer Science, Bahadur&Sastry, Narosa Publishing Houses, 2002
- 2) Polymer Science, Gowarikar, John Wiley & Sons, 1986
- 3) Encyclopedia of Polymer Science & Technology, John Wiley & Sons, Inc, 1965

- 4) Encyclopedia of Polymer Science & Engineering, John Wiley & Sons, Inc, 1988
- 5) Textbook of Polymer Science, Billmeyer, John Wiley & Sons, 1984
- 6) Polymer Chemistry, Seymour and Carraher, Marcel Dekker, 2003
- 7) Handbook of Rubber Technology, S Blow, Galgotia Publications Pvt. Ltd, 1998
- 8) Rubber Technology, Morell S H, Applied Science Publication, 1981
- 9) Introduction to Rubber Technology, Andrew Ciesielski, RAPRA Publications, 2000
- 10) Rubber Technology, Maurice Morton, Springer, 1st Ed, 1987

**Course Outcomes:**

1. To express. About the natural polymers and rubber
2. To be able to utilize this knowledge for the processing.
3. To be able to apply this knowledge for the characterization of polymers and rubber
4. To build a bridge between theoretical and practical concept used in industry

**List of Open Source Software/learning website:**

- 1) [www.iri.net.in](http://www.iri.net.in)
- 2) [www.ipiindia.org](http://www.ipiindia.org)
- 3) Delnet

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.