

GUJARAT TECHNOLOGICAL UNIVERSITY

RUBBER TECHNOLOGY (40)

ELASTOMERIC GEL & POLYMER CLAY (EGPC)

SUBJECT CODE: 2734002

M.E. SEM-III

Type of course: Major Elective - IV

Prerequisite: NA

Rationale: NA

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|-----------------|----|---|---------|-------------------|---------|-----------------|--------|----|----|-------------|
| L | T | P | | Theory Marks | | Practical Marks | | | | |
| | | | ESE (E) | PA (M) | ESE (V) | | PA (I) | | | |
| | | | | | ESE | OEP | PA | RP | | |
| 3 | 2# | 2 | 5 | 70 | 30 | 20 | 10 | 10 | 10 | 150 |

Course Content:

| Sr. No. | Content | Total Hrs | % Weightage |
|---------|---|-----------|-------------|
| 1 | Introduction: Electrically Conductive & Photonic Polymers, Magnetically Activated Polymers, Ferroelectric Polymers, Liquid Crystal Elastomers, Dielectric Elastomers, Ionic and Nonionic Polymer Gels, | 7 | 10 |
| 2 | Ionic Polymeric Gel : Introduction, PAPMS Gels, Gel Preparation, Gel Application etc. | 7 | 15 |
| 3 | Ionic Polymers : Engineering, Industrial and Medical Applications etc. | 7 | 10 |
| 4 | Silicone Gel : Manufacturing, Properties, Applications Comparison, Correlation etc. | 7 | 15 |
| 5 | PAMPS Gel : Introduction, PAMPS Gel, Gel Preparation, Gel Application etc. | 7 | 15 |
| 6 | Polymer/ Rubber Clay : Introduction, Preparation & Properties, Effect of Vulcanisation ingredients etc. | 7 | 15 |
| 7 | Working with Polymer Clay : Conditioning, Storage, Sizing Clay, Polymer Clay Tools, Curing, Finishing, Mixing Clay Colors | 6 | 10 |
| 8 | Working with Liquid Polymer Clay & Metal Clay : Introduction, Metal Clay Tools, Processes, Applications etc. | 6 | 10 |

Reference Books:

1. Polymer Clay Mixed Media Jewelry by Shirley Rufener
2. Artificial Muscles- Applications of Advanced Polymeric Nanocomposites by Mohsen Shahinpoor, Kwang J .Kim, Mehran Mojarrad.

3. Advanced Rubber Composites by G.Heinrich

Course Outcome:

After learning the course the students should be able to:

1. Understand the Importance Electrically Conductive & Photonic Polymers.
2. Identify the different types of Gel.
3. Able to Compare Silicone Gel & PAMPs Gel.
4. Learn about the Magnetically Activated Polymers & Ferroelectric Polymers.
5. Learn about the Liquid Crystal Elastomers & Dielectric Elastomers,
6. Importance of Ionic and Nonionic Polymer Gels.
7. Learn about Working with Polymer Clay & Metal Clay

List of Experiments:

1. Tutorials/Presentation/Practicals based on above topics.

Design based Problems (DP)/Open Ended Problem:

1. Polymer opals as novel photonic materials.
2. Optical Characterization and Properties of Polymeric Materials for Optoelectronic and Photonic Applications.
3. Silicone Gel as an Insulation Material for HV-Insulation Applications.

Major Equipments: Polymer clay tools & Metal Clay tools etc.

List of Open Source Software/learning website:

- <http://www.np.phy.cam.ac.uk/>
- <http://www.crcpress.com>
- <http://www.ijastnet.com/>
- <http://www.te.com/>

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.