

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: RUBBER TECHNOLOGY
SUBJECT NAME: Rubber Waste Utilisation (RWU)

SUBJECT CODE: 3714011
M.E. 1stSEMESTER

Type of course: Program Elective-II (M.E.Rubber Technology)

Prerequisite:

Rationale:

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | Total Marks |
|-----------------|---|---|---------|-------------------|--------|-----------------|--------|-------------|
| L | T | P | | Theory Marks | | Practical Marks | | |
| | | | | ESE(E) | PA (M) | PA (V) | PA (I) | |
| 3 | 0 | 2 | 4 | 70 | 30 | 30 | 20 | 150 |

Content:

| Sr. No. | Content | Total Hrs | % Weightage |
|---------|---|-----------|-------------|
| 1 | Introduction: Types and Specification of the wastes, Waste reuse, The manufacture of other materials and articles from wastes, Waste hierarchy etc. | 8 | 15 |
| 2 | Rubber Waste disposal Options : Retreading, Crumbling ,Pyrolysis, Incineration Re-use and Disposal etc. | 8 | 15 |
| 3 | Rubber Waste Disposal Techniques : Life cycle of a rubber product, Recycling : Barriers and Benefits, Land filling, Reuse of waste as drainage culverts, Resource depletion etc. | 8 | 10 |
| 4 | Incineration : Waste to energy incineration, Incineration of waste as a fuel substitute, advantages etc. | 7 | 15 |
| 5 | Pyrolysis : Introduction, Pyrolysis Process, Product obtained from Vacuum Pyrolysis, Recovery of By products. | 7 | 15 |
| 6 | Energy Recovery : | 8 | 15 |

| | | | |
|---|--|---|----|
| | Options for energy recovery from waste tyres, Impacts of tyres in energy recovery, Mass & Energy balance, Co-production of energy and activated carbon black from rubber wood waste etc. | | |
| 7 | Utilisation of Rubber waste : Concept of Green Technology, Production of corrugated asbestos boards, roofing , tie plates, Rezdor slabs and floor slabs for stock farms, crumb rubber, reclaim rubber, rubber asphalt and other applications etc. | 8 | 15 |

Reference Books:

- Reprocessing of Tyres and Rubber Waste by Valadimir M. Makarov & Valerij F. Drozdovski
- Energy from Rubber Waste Proceedings .

Course Outcome:

After learning the course the students should be able to:

- Understand the types and Specification of the wastes.
- Identify & Compare the Rubber Waste disposal Options.
- Able to understand the Pyrolysis Process, Product obtained from Vacuum Pyrolysis .
- Learn about the different Rubber Waste Disposal Techniques.
- Learn about how to convert the Waste into energy by incineration technique.
- Importance of Concept of Green Technology.
- Learn about Co-production of energy and activated carbon black from rubber wood waste.

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Major Equipment:

Shredders, Oven, Muffle Furnace etc.

List of Open Source Software/learning website:

- <http://www.bvsde.paho.org/>
- <http://www.crcpress.com>
- <https://www.linkedin.com/advancements-in-rubber-disposal-biodegradation-and-the-environment>