GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

Mechanical Engineering (Cryogenic Engineering)

Subject Name CRYOENIC APPLICATIONS

Sr.No	Course content
1.	Cryogenic properties of materials: thermal properties, electrical properties, superconductivity, super fluidity.
2.	Space applications: Missile launching, propellant pressurizing systems, vehicle cooling, cryopropollents, space simulators
3.	Biological applications: semen preservation, blood preservation, bone morrow preservation, tissue and micro organism preservation,
4.	Medical Application: cryosurgery, skin disease treatment
5.	Electronic applications: MASER, LASER, infrared detectors, photomultipliers.
6.	Superconductive devices: Superconducting bearings, magnets, motors gyroscope and switches, cryotrons, MRI.
7.	Nuclear applications: bubble chambers, radioactive waste disposal.
8.	Metal fabrication applications: cold stretching, cryoforming, metal stress reliving, annealing.
9.	Food handling applications: food freezing, food shipment and handling.
10	Low temperature preservation of tissues: harvesting of tissues, processing of tissues, preservation and storage of tissue, deep freezing, freeze drying.
11.	Agriculture applications: fisheries, animal science

12.	Genetic applications, embryo freezing
13.	Miscellaneous applications

List of Experiments:

1. Analysing mechanical & thermal properties of metals at cryogenic temperatures.
2. Understanding superconductivity and Meissener Effect.
3. Study of various types of cryogenic engines.
4. To understand various methods of blood preservation.
5. Study of Cryogenic application in MRI.
6. Study of various applications super conductivity in electrical and electronic devices.
7. Study of construction & working of a space simulation chamber.
8. Study of various types of cryogenic surgery probes.
9. Study of effect of cryogenic temperatures on fabrication technology.

Reference Books:

1. Cryogenics research and applications – Marshall Sittig & Stephen Kidd
2. Advances in Cryogenics – Proceedings of International Conference on Cryogenics, Calcutta, December 6-10, 1988.
3. Cryogenic Engineering & Gas Applications – By Dr. P.K.Bose.
4. Cryogenic technology and Applications – By A. R. Jha.