GUJARAT TECHNOLOGICAL UNIVERSITY
M.E Semester: 1
Mechanical Engineering (Thermal Engineering)

Subject Name: CRYOGENIC HEAT EXCHANGERS

Sr. No.	Course Content
1.	Advanced heat transfer: steady state conduction with two and three dimension with heat generation, solution of problem by numerical ,finite difference and graphical methods, matrix ,finite element methods, transient heat conduction and solution by analytical correlation for convective heat transfer for natural and forced convection ,transition flow, flow outside of duets, boiling heat transfer coefficients .pressure drop in two phase flow, frost formulation ,condensation ,heat transfer coefficient during condensation.
2.	Shell & tube type heat exchangers-design
3.	Fin effectiveness , surface effectiveness and overall coefficients of heat transfer. Overall pressure drop, effectiveness- NTU approach solution by equations and graphical methods,. Effect of heat-exchanger effect of various specific on exchanger performance.
4.	Design of regenerative type heat exchanger for single and multi stage, Philips, Gifford single volume, double volume, Vuilleumier, magnetic cryorefrigerators.
5.	Design of heat exchangers for liquefaction systems ,single tube ,double tube Linde heat exchangers three channel heat exchangers ,multiple tube type ,Giaque Hampton and Collins type heat exchangers.
6.	Finned tube and plate type heat exchangers, different configuration heat transfer coefficients and friction coefficient for various configuration..
7.	Single tube Linde exchanger, double tube type, three channel heat exchanger. Linde multiple tube type , Giauque Hampson, Collin's,
8.	Plate fin heat exchanger ,different fin configuration, heat transfer coefficients , and friction factors for various configurations.
9.	Testing of heat exchangers as per standards.

Reference Books:

1. Saunders, E.A.D., ”Heat exchange – selection design and construction”, Longmann Scientific and Technical, N.Y.2001.

2. Kays, V.A and London,A.L., “Compact Heat Exchangers”, McGraw Hill, 2002

3. Holger Martin , “Heat Exchanger” Hemisphere Publ.Corp., Washington,2001

4. Kuppan,T., “Heat Exchangert Design Handbook”, Macel Dekker, Inc., N.Y.,2000

5. Seikan Ishigai, “Steam Power Engineering, Thermal and Hydraulic Design Principles”, Cambridge Univ. Press,2001