

INTRODUCTION OF NEW COURSE

Course Title	DESIGN OF HEAT EXCHANGERS	Course No (will be assigned)				
Specialization	Mechanical Engineering	Structure (LT-PC)	3	0	0	3
Offered for	PG/	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty	Dr. S. Jayavel	Type	New <input checked="" type="checkbox"/>	Modification <input type="checkbox"/>		
Pre-requisite	Fluid Mechanics & Heat Transfer	To take effect from	Aug 2013			
Submission date	March 2013	Date of approval by AAC				
Objectives	To impart knowledge to the students in design and analysis of various types of heat exchangers; sizing of heat exchangers and application of various heat exchangers					
Contents of the course (With approximate break up of hours)	<p>Classification of heat exchangers: Introduction, Parallel flow, Counter flow, Cross flow, Shell & tube, Plate type heat exchangers, Fin-tube and fin-plate heat exchangers, Single pass, Multi pass, Steam generators, Recuperator & Regenerator, Direct and indirect contact heat exchangers, Compact heat exchangers (6)</p> <p>Fundamentals of heat transfer between fluids: Introduction, Heat transfer mechanisms, Heat transfer area, Heat transfer coefficient, Thermal resistances and their combination, Fouling, Logarithmic mean temperature difference (6)</p> <p>Thermal design of heat exchanger: Arrangement of flow path in heat exchangers, Basic governing equations, Heat transfer correlations, Overall heat transfer coefficient, LMTD analysis, NTU method, Design parameters & procedure, Pressure drop, Effectiveness (8)</p> <p>Design and construction of shell-and-tube heat exchangers: Principle components, Tube distribution, tube to tube sheet joint, Multi-pass, Multi-shell, Tube vibration, Heat transfer augmentation (8)</p> <p>Plate heat exchangers: Operating principle, Series-parallel combination, Heat transfer and pressure drop correlations, LMTD corrections (6)</p> <p>Condensers and Evaporators: Mechanism of condensation, Single-component vapour condenser, desuperheater condenser, Use of steam as process heating medium, Mechanism of evaporation, Pool boiling, Flow boiling, Reboilers, Thermal analysis (8)</p>					
Textbook	1. Ramesh K. Shah, Dusan P. Sekulic, Fundamentals of Heat Exchanger Design, Wiley; ed-1 2002.					
References	<p>1. Eduardo Cao, Heat Transfer in Process Engineering, Mc Graw Hill, 2010</p> <p>2. Kuppam T., Heat Exchanger Design Hand Book, Taylor & Francis, 2009</p>					