RKUNIVERSITY

SYLLABUS

Course Title	DESIGN OF HEAT EXCHANGE EQUIPMENTS
Course Code	TH214
Course Credit	Lecture : 04
	Practical : 01
	Tutorial : 00
	Total : 05

Course Learning Outcomes

At the end of the course the students will be able to

- **Understand** and solve the real life industrial problems for heat exchanger design and optimization.
- **Analyze** and get thorough insights of heat exchanger design which will be helpful for students to pursue their dissertation work.
- **Develop** on experience in MATLAB for design and optimization problems related to heat exchanger design.

Detailed Syllabus

Sr. No.	Name of chapter & Details	Hours Allotted
	SECTION-I	
1	**Review of the basic fundamentals:** • Heat transfer mechanism, heat transfer between fluids, heat transfer principles. • Basics of conduction and convection correlation.	4
2	**Introduction to heat exchanger and classification:** • Detailed classification of heat exchangers. • Detailed explanation of working of various types of heat exchanger and the functioning of the heat exchanger components.	8
3	**Basic design methodology of heat exchangers:** • Logarithmic mean temperature difference method. • Number of transfer units(NTU)-Effectivess method. • Analysis of heat exchanger using the above methods. • Comparision of both the design methods.	10
4	**Design of double pipe heat exchangers.**	3

5	**Plate type heat exchanger design.**	**3**
	SECTION-II	
6	**Design of shell and tube heat exchangers:** • Shell side and tube side design considerations • Kerns method • Bell-delware method, j factors • Solution of design using MATLAB software in the above methods. • Conventional design methods.	**12**
7	**Compact heat exchanger design:** • J factors, design method	**3**
8	**Condenser design:** • Condenser classification and design method for surface condensor	**3**
9	**Evaporators:** • Classification and design methods.	**3**
10	**Miscellaneous in heat exchanger design:** • TEMA standards for heat exchanger design • Introduction to ASME codes and applications • Heat exchanger design considerations and methodology • Fouling of heat exchanger and its prevention	**7**

Instructional Method and Pedagogy:

- At the beginning of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc.
- Attendance is compulsory in lectures and laboratory.
- Minimum two internal exams will be conducted and average of two will be considered as a part of overall evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regularly.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Tutorials and assignments are to be submitted as term-work in laboratory related to course contents.

Reference Books:

1. Saunders, E.A.D., "Heat Exchangers – 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 Exchangers" Hemisphere Publ. Corp. , Washington, 2001.
4. Kuppan, T., "Heat Exchanger Design Handbook", Macel Dekker, Inc., N.Y. , 2000
5. Seikan Ishigai, "Steam Power Engineering, Thermal and Hydraulic Design Principles",Cambridge Univ. Press, 2001.
6. fundamentals of heat exchanger design, R.K.Shah
7. heat exchangers, sadickakac