

International Summer School Manipal University Jaipur [ISSMUJ]-2022

[Hybrid Mode]

Course Overview

Name of Course: Air-Conditioning System Design

Name of instructors	: Dr. Rahul Goyal (MUJ) and Dr Shiv Raj Dhaka, (IGBC)
Session	: June-July 2022
Language of instruction	: English
Number of contact hours	: 36
Credit awarded	: 03

Objectives of Course

- To understand basics of air-conditioning, design concepts, heat load, perform heat load calculations, understand psychometric chart and explore tools to derive cooling/heating capacity.
- To impart learning on Codes and Standards of ASHRAE and ISHRAE related to air-conditioning, selection of air-conditioning system type based on building usage/application.

Syllabus

Psychrometric properties and processes, Air-conditioning loads, effective temperature & chart, Energy conservations Measures, and air-conditioning for special applications: waste heat recovery, Economiser, Cogeneration system, passive cooling and heating system examples (geothermal, earth air tunnel heat exchanger-EATHE, solar chimney, Radiant Cooling etc). Green Building Guidelines for Energy Efficiency in Buildings, Green Building Certification, Best Practices in Green Buildings for Energy Efficiency in Air-conditioning, ASHRAE Fundamentals, basics of ASHARE 901., ASHRAE 62.1, ECBC 2017, ASHRAE 55, new & eco-friendly refrigerants (low or no GWP -Global Warming Potential refrigerants), National standardization bodies, Process of adoption, Use of International Standards, Safety issues related to refrigeration and air-conditioning, Industrial and field applications.

Organization of course

Total contact hrs 36		
1 st week:	8 hrs (classes)	4 hrs (Self-study/ Discussion/Tutorial)
2 nd week:	8 hrs (classes)	4 hrs (Mid-term exam/Assessment/Discussion/Tutorial)
3 rd week:	8 hrs (classes)	4 hrs (End Term Exam/Presentation/Report)

Mode of lectures: Offline Lectures; Tutorial Sessions; Discussion.

Course Plan

Lecture no.	Topic	Lecture mode	Instructor(s)
L: 1-5	Psychrometric properties and processes	Offline Lectures; Tutorial Sessions; Discussion	Dr. Rahul Goyal
L: 6-12	Air conditioning loads (heat Load)	Online Lectures; Tutorial Sessions; Discussion	Dr. Rahul Goyal
L: 13-16	Thermal Comfort, Effective temperature & chart	Online Lectures; Tutorial Sessions; Discussion	Dr Shivraj Dhaka
L: 17-19	Energy conservations and air conditioning for special applications	Offline Lectures; Tutorial Sessions; Discussion	Dr. Rahul Goyal Dr Shivraj Dhaka
L: 20-25	Adoption of International Standards at National Level, National standardization bodies, Use of International Standards	Offline Lectures; Tutorial Sessions; Discussion	Dr Shivraj Dhaka
L: 26-30	Safety issues related to refrigeration and air conditioning, Industrial and field applications	Offline Lectures; Tutorial Sessions; Discussion	Dr Shivraj Dhaka
L: 31-36	Project Presentation; Report/Paper Writing; Evaluation.	Tutorial Sessions; Discussion	Dr. Rahul Goyal Dr Shivraj Dhaka

Brief profile of the instructors

Dr. Rahul Goyal- Professor and Head, Department of Mechanical Engineering
Ph.D. (Mechanical Engineering) Malaviya National Institute of Technology
Academic & Research Experience: 19 years



Dr. Shivraj Dhaka,
Counsellor, Indian Green Building Council (IGBC)
Confederation of Indian Industry (CII)

