

# Advanced Refrigeration Systems

## Overview

Refrigeration is a critical process and is widely used in many sectors, including industrial, transportation, agricultural, commercial and residential sectors. It is uniquely positioned as a multi-disciplinary field encompassing mechanical, chemical, industrial and food engineering, as well as chemistry. It therefore plays an important role in energy, environment, economy and sustainable development of the world. It is also recognized as an active area of research, aiming at developing new systems, applications and technologies for better efficiency, cost effectiveness, environment and hence sustainability. Furthermore, it is equally important to design, analyze, assess and improve refrigeration systems by employing exergy and exergoeconomic tools. In this regard, this course will cover fundamental aspects of thermodynamics through energy and exergy, refrigerants, refrigeration system components, refrigeration cycles and systems, advanced refrigeration cycles and systems, renewable energy based integrated refrigeration systems, heat pipes, food refrigeration, food freezing, and environmental impact and sustainability assessments of refrigeration systems. Further, analytical techniques, models, correlations and procedures will also be taught with examples and case studies will also be discussed in this course. Moreover, recently adopted renewable energy based integration systems and ecofriendly refrigerants will be covered in the course.

|   |   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
|---|---|---------------------------------|-------------------|---|-------------------|-----------------------------|-------------------|--------------------------|-------------------|------------------------|-------------------|
| <b>Dates for course</b>                 | <b>17-22 December 2018</b>  |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Host Institute</b>                   | <b>National Institute of Technology, Rourkela</b>   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Course credit</b>                    | <b>2</b>  |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Maximum No. of Participants</b>      | <b>50</b>   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>You Should Attend If...</b>          | <ul style="list-style-type: none"><li>▪ You are an engineer with the back ground of mechanical, electrical, electronics, chemical, biotechnology, biomedical, food processing engineering and interested in more understanding of the fundamentals in energy and exergy analyses, fundamentals of refrigeration systems and their advancements</li><li>▪ You are a research scientist interested in design and development of refrigeration systems</li><li>▪ You are a faculty member in mechanical, electrical, electronics and chemical engineering or physics or chemistry</li><li>▪ You are working in refrigeration and air conditioning industry or its related industry, biotechnology, biomedical, food processing and chemical industry</li></ul> |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Fees</b>                             | <p>The participation fees for taking the course is as follows:</p> <table><tr><td><b>Participants from abroad</b></td><td><b>: US \$250</b></td></tr><tr><td><b>Industry/ Research Organizations</b></td><td><b>: Rs.10000</b></td></tr><tr><td><b>Students (UG and PG)</b></td><td><b>: Rs. 1500</b></td></tr><tr><td><b>Research Scholars</b></td><td><b>: Rs. 3000</b></td></tr><tr><td><b>Faculty members</b></td><td><b>: Rs. 5000</b></td></tr></table> <p>The course fee includes all instructional materials, computer use for tutorials and assignments, and laboratory equipment usage charges. The participants will be provided shared accommodations at the institute guest house, based on the availability, on payment basis.</p>            | <b>Participants from abroad</b> | <b>: US \$250</b> | <b>Industry/ Research Organizations</b> | <b>: Rs.10000</b> | <b>Students (UG and PG)</b> | <b>: Rs. 1500</b> | <b>Research Scholars</b> | <b>: Rs. 3000</b> | <b>Faculty members</b> | <b>: Rs. 5000</b> |
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| <b>Students (UG and PG)</b>             | <b>: Rs. 1500</b>   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Research Scholars</b>                | <b>: Rs. 3000</b>   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |
| <b>Faculty members</b>                  | <b>: Rs. 5000</b>   |                                 |                   |   |                   |                             |                   |                          |                   |                        |                   |

## The Faculty



**Dr. Ibrahim Dincer**  
Professor of  
Mechanical Engineering  
University of Ontario  
Institute of Technology  
Ontario, Canada

Prof. Ibrahim Dincer has authored and co-authored several books and book chapters (including multiple on refrigeration), over 1000 refereed International Journal and conference papers and numerous technical reports. He has chaired in many national and international conferences, symposia, workshops and technical meetings and has delivered over 300 keynote and invited lectures. He is an active member of various international scientific organizations and societies and serves as editor-in-chief for International Journal of Energy Research by Wiley and International Journal of Exergy by Inderscience, as well as associate editor, regional editor, and editorial board member on various prestigious International journals. He is a recipient of several research, teaching and service awards, including the Premier Research Excellence Award in Ontario in 2004. He has made innovative contributions to the understanding and development of sustainable energy technologies and their implementation, particularly through exergy. He is the chair of a new technical group (Exergy Analysis for Sustainable Buildings) in the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), and he has also been actively working in the area of sustainable energy technologies.



**Dr S. Murugan**  
Professor  
Department of  
Mechanical  
Engineering  
National Institute of  
Technology Rourkela  
India

Prof. S.Murugan is actively involved in carrying out research in the area of refrigeration and air conditioning, waste management, renewable energy technology and IC Engines. He has been teaching various subjects in thermo fluids and automotive engineering. He has authored and coauthored 70 research articles in peer reviewed International Journals, 80 research articles in proceedings of the International Conferences and a few book chapters.

## Course Co-ordinator

**Prof. S.Murugan**

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For Registrations log on to following weblink:  
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