

## Heat and Mass Transfer Selected Topics

### **1. Fundamentals of Heat and Mass Transfer**

- 1.1. Conduction heat transfer
- 1.2. Thermo-physical properties of materials
- 1.3. Micro and nano-scale heat transfer
- 1.4. Forced convection heat transfer
- 1.5. Natural convection heat transfer
- 1.6. Mixed convection heat transfer
- 1.7. Heat transfer in boundary layers
- 1.8. Heat transfer from extended surfaces
- 1.9. Radiation
- 1.10. Thermodynamics and combustion
- 1.11. Refrigeration and air conditioning
- 1.12. Refrigerants and mixtures
- 1.13. Advection heat and mass transfer
- 1.14. Mixing by chaotic advection
- 1.15. Turbulent flow and heat transfer
- 1.16. Heat transfer enhancement
- 1.17. Transport phenomena in porous media
- 1.18. Non-Newtonian fluid flow and heat transfer
- 1.19. Multiphase flow and heat transfer
- 1.20. Boiling heat transfer
- 1.21. Condensation
- 1.22. Sensible and latent heat transfer in liquid-gas systems
- 1.23. Reactive flows

### **2. Heat Transfer Devices and Equipments**

- 2.1. Heat Exchangers
- 2.2. Turbo-machinery
- 2.3. Refrigeration equipments
- 2.4. Cryogenic devices
- 2.5. Expansion valves
- 2.6. Air conditioning devices
- 2.7. Fuel cells
- 2.8. Chemical reactors

- 2.9. Heat pipes
- 2.10. Laser-Doppler Anemometer and Hot Wire Anemometer
- 2.11. Vortex generators for heat transfer enhancement

### **3. Applications of Heat and Mass Transfer**

- 3.1. Insulation
- 3.2. Atmospheric convection
- 3.3. Cryogenic systems
- 3.4. Materials processing and manufacturing
- 3.5. Nuclear heat transfer
- 3.6. Biological heat and mass transfer
- 3.7. Heating considerations in building design
- 3.8. Drying
- 3.9. Mixing by chaotic advection
- 3.10. Vortex enhanced heat transfer
- 3.11. Environmental and heat transfer
- 3.12. Combustion systems
- 3.13. Solar heat calculations
- 3.14. Cooling of electronic equipments
- 3.15. Evaporative cooling
- 3.16. Mist cooling by droplet evaporation
- 3.17. Vapor ejector refrigeration system
- 3.18. Sorption systems
- 3.19. Food preservation
- 3.20. Turbine blade cooling
- 3.21. Jet and spray cooling
- 3.22. Heat removal from compressors in air conditioning systems
- 3.23. Heat removal in IC engine applications
- 3.24. Radiators of IC engines

### **4. Energy Systems and Energy Conservation**

- 4.1. Sensible and latent heat storage systems
- 4.2. Geothermal and renewable energy
- 4.3. Ocean and wind energy harvesting
- 4.4. Biomass energy
- 4.5. Solar energy utilization
- 4.6. Heating, ventilation and air conditioning
- 4.7. Energy storage using PCM and metal hydride systems

- 4.8. Performance optimization of heat exchangers
- 4.9. Vapor compression refrigeration systems
- 4.10. Vapor absorption refrigeration systems
- 4.11. Solar assisted refrigeration systems
- 4.12. Performance improvement in thermal power plant applications
- 4.13. Heat transfer enhancement
- 4.14. Thermal energy conservation
- 4.15. Coal combustion
- 4.16. Fluidized bed combustion
- 4.17. Performance improvement of air conditioners using PCM
- 4.18. Improvement of air distribution systems in air conditioning
- 4.19. Generator-Absorber heat exchanger (GAX) systems
- 4.20. Falling film and bubble absorbers
- 4.21. PV systems in solar energy utilization

## **5. Miscellaneous Topics**

- 5.1. Instrumentation and control
- 5.2. Computational Fluid Dynamics (CFD)
- 5.3. Phase change materials
- 5.4. Food preservation
- 5.5. Numerical heat transfer
- 5.6. Rayleigh-Benard convection
- 5.7. Flow past heated objects
- 5.8. Acoustics and noise control
- 5.9. Fans, blowers and compressors
- 5.10. Filters
- 5.11. Flame spread in pool combustion
- 5.12. Fire propagation
- 5.13. Fuel and droplet combustion
- 5.14. Droplet evaporation
- 5.15. Environmental science and engineering
- 5.16. Experimental techniques
- 5.17. Rheological fluid systems

## **6. Any other:**