

## Course Outline [2013]

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ME 415: Refrigeration & Building Mechanical Systems



## Tentative Lecture Schedule

| Topic   | No. of Lectures |
|---|-----------------|
| Refrigeration Applications                    | 1               |
| Vapor Compression Refrigeration:              | 4               |
| - Working principle & analysis                |                 |
| - Multi-evaporator & multi-compressor systems |                 |
| Refrigeration Equipment:                      | 7               |
| - Compressor, Condenser, Evaporator,          |                 |
| - Expansion & Control devices, Refrigerants   |                 |
| Vapour Absorption Refrigeration               | 2               |
| Different Refrigeration Methods & Cryogenics  | 2               |
| Air-Conditioning Systems & Thermal Comfort    | 2               |
| Cooling Load Calculations                     | 3               |
| Psychrometric Analysis                        | 2               |
| Air Distribution Systems & Duct Design        | 2               |
| Air-Conditioning Equipment & Control System   | 1               |
| Fire Hazards & Fire Fighting Equipment        | 3               |
| Vertical Transportation, Escalator & Ramp     | 3               |



## Syllabus

Concept of refrigeration and its applications; Different refrigeration methods; Analysis of vapour compression refrigeration, absorption refrigeration and air-cycle refrigeration systems; Refrigerants; Refrigeration equipment: compressors, condensers, evaporators, expansion devices, other control and safety devices; Multi-evaporator, multi-compressor systems; Low temperature refrigeration.

Concept of air conditioning and its uses; Cooling load calculation; Psychrometric analysis; Air conditioning systems; Air distribution systems; Duct design methods; Air conditioning equipment; Application criteria; Control systems.

Fire Hazards; Fire fighting equipment; Vertical transportation, its system design; Escalators and moving ramps.



## Bibliography

- Hundy, Trott & Welch (2008), *Refrigeration & Air-conditioning*, Butterworth-Heinemann.
- Ameen (2006), *Refrigeration & Air-conditioning*, Prentice Hall.
- McQuiston, Parker & Spitler (2005), *Heating, Ventilating & Air-conditioning: Analysis & Design*, J. Wiley & Sons, Inc.
- Stoecker & Jones (1983), *Refrigeration & Air-conditioning*, McGraw-Hill, Inc.
- Dossat (1996), *Principles of Refrigeration*, Prentice Hall.
- McDowall (2007), *Fundamentals of HVAC Systems*, Elsevier.
- Grondzik, Kwok, Stein & Reynolds (2010), *Mechanical & Electrical Equipment for Buildings*, J. Wiley & Sons, Inc.

