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Department of Mechanical Engineering	
Heating and Air Conditioning (67440)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Heat Transfer (67415) OR Heat Transfer I (67420) OR Heat Transfer Operations (64334) P2 : Heat Transfer Operations (64334) OR Fluid Mechaics I (67320) OR Fluid Mechanics (67313) OR Thermodynamics II (67321)

Course Contents

Criteria for thermal comfort, introduction to heating and air conditioning systems. Vapor compression systems. Psychrometry, heating and cooling loads calculations. Classification of air conditioning systems. Duct system design, and pipe system design. Air conditioning control systems. Standards, symbols, selection, and layout and installation of heating and air conditioning systems components. Students in individual or groups should perform short projects to practice the main principles of the course.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	An ability to compute heating and cooling loads for a given building in a given location.	E	45 %
2	Designing hot water heating system and piping and duct systems for AC systems	C	25 %
3	Selecting suitable components (pumps, chillers, PU etc.,) for typical AC systems.	E	10 %
4	An ability to work in teams in designing an integrated air conditioning system for actual application.	D	20 %

Textbook and/ or Refrences

Textbook:M. A. Alsaad &M. A. Hammad, "HeatingandConditioning", Fifth Edition, 2011References:W. J. Mc Guinness &B. Stein, "Building Technology, Mechanical and Electrical Systems", John Wiley &Sons.F. C. Mc Quiston, J. D. Spitter, ' Heating, Ventilation, and Air Conditioning Analysis and Design', John Wiley &Sons 2010.M. A. Alsaad and M. A. Hammad, " Heatinganairconditioning",SecondEdition 1997.ASHREA Handbook. American Society ofHeating, Refrigeration, and Air Conditioning Enginees.G. J. Vanwylen, R. E. Sonntag and C. B. Rgnakke, "Fundamental of classicThermodynamics", John Wiley &Sons, 2010.P. L. Martin and D. R. Oughton, "Heating &Air Conditioning of Buildings", Eighth Edition, 2010.R. Dodge and W. Vodson, "National Plumping Codes", Mc Graw-Hill, 1998.N. R. Grimm and R. C. Rosaler, "HVAC Systems and Components Handbook. Mc Graw-Hill, 1998.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Projects	20 %
Final Exam	40 %

Course Plan

Week	Topic
1	Air-conditioning systems
2	Comfort and Health-Indoor Environmental Quality
3,4	Heat Transmission in Building Structures
5,6	Heating load calculation

7	First Exam
8,10	Hot water heating system
11,12	cooling load calculation
13	Second Exam
14	Selection of heating and air conditioning systems components
15	Discussing students projects
16	Final Exam