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| Department of Building Engineering | |
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| **HVAC System (68341)** | |
| **Total Credits** | **3** |
| **major compulsory** | |
| **Prerequisites** | P1 : Environmental Systmens II- Thermal Systems (68331) |

**Course Contents**

This course is a study of air-conditioning processes; psychometric and humid air calculations, heating-and cooling calculations, hot-water systems theory and design, duct systems theory and design.

| | Intended Learning Outcomes (ILO's) | Student Outcomes (SO's) | Contribution |
|---|---|---|---|
| 1 | 1- An ability to define the issues considered in HVAC design | C | 5 % |
| 2 | 2- An ability to list the factors influencing thermal comfort and how to maintain indoor quality | H | 10 % |
| 3 | 3- An ability to calculate heating and cooling loads | E | 40 % |
| 4 | 4- An ability to design hot water heating system | E | 20 % |
| 5 | 5- Selection of heating elements. | C | 10 % |
| 6 | 6- Carry out a duct design system | K | 15 % |

**Textbook and/ or Refrences**

Textbook: 1. M. A. Alsaad &M. A. Hammad, "Heating and Air Conditioning", Fourth Edition, 2007 References: 2. W. J. Mc Guinness &B. Stein, "Building Technology, Mechanical and Electrical Systems", John Wiley &Sons. 3. F. C. Mc Quiston, J. D. Spitter, ' Heating, Ventilation, and Air Conditioning Analysis and Design', John Wiley &Sons 2000. 4. M. A. Alsaad and M. A. Hammad, " Heating and air conditioning", Second Edition 1997. 5. ASHREA Handbook. American Society of Heating, Refrigeration, and Air Conditioning Enginees. 6. G. J. Vanwylen, R. E. Sonntag and C. B. Rgnakke, "Fundamental of classical Thermodynamics", John Wiley &Sons, 1994. 7. P. L. Martin and D. R. Oughton, "Heating &Air Conditioning of Buildings", Eighth Edition, 2000. 8. R. Dodge and W. Vodson, "National Plumping Codes", 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 |
| 2-3 | Moist Air Properties and Conditioning Processes |
| 4 | Comfort and Health-Indoor Environmental Quality |
| 5 | Heat Transmission in Building Structures |
| 6 | Heating load calculation |
| 7 | first exam |
| 8-9 | Hot water heating system |
| 10 | Under floor heating system |
| 11-12 | cooling load calculation |
| 13 | second exam |
| 14 | Space Air Diffusion |

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| 15 | Fans and Building Air Distribution |
| 16 | final exam |