HEATING AND VENTILATION SYLLABUS

COURSE DESCRIPTION:

This ten session course consists of an introduction or review of heat, heat measurement, material specific heat, ambient/design conditions and code requirements. Also building heat loss, hydronic (hot water heating) systems, air quality building ventilation, hot air heating systems and industrial ventilation methods design will be studied in detail. Heating and ventilation equipment and applications will be investigated. Students, in addition to quizzes and homework, will prepare a heating and ventilation project for a small medical office building.

COURSE OBJECTIVES :

- To develop competence to design a heating and air quality ventilation systems for a small commercial building.
- To understand and be able to develop air change ventilation systems.
- To understand and be able to develop heat removal ventilation systems.
- To develop a knowledge of the basic heat exchange, piping, duct, fan and pump technology necessary as a prerequisite for taking the Air Conditioning Course.

TEXTS AND SUPPLEMENTAL MATERIALS: (Provided by The Engineers Club of Philadelphia)

- Trane Heating and Air Conditioning Package consisting of “trane Air Conditioning Manual”, several Trane application manuals, psychometric charts and a Trane Duculator.
- Bell and Gossett System Syzer Calculator.
- Carrier System Design Manual Part 1 Load Estimating
- Carrier System Design Manual Part 2 Air Distribution
- Carrier System Design Manual Part 3 Piping Design
- Various Handouts

Note: These items will also be used for the Air Conditioning Course.

COURSE REQUIREMENTS :

- Attend all class sessions. Attendance at all classes is mandatory. If a class has to be missed consult with the instructor for make up. Take notes in class. Some material is not covered in the texts.
- Complete all assigned readings. Each reading is to be done in advance of the class day. Hi-lite important facts in your texts. You may not need to remember them but you will be able to find them.
- Because of the intense nature of this course homework may require as much as four hours per hour of class time. Turn in homework on time. A deduction will be made from your mark for late work.
- All homework on 8 1/2” x 11” paper with your name on it
- Drawings on 11” x 17” paper.
- Spread Sheets are OK if columns and rows are properly identified and all data is shown. (No hidden columns) Also refer to formula for calculated values.

Suggestions:

- Refer to your data source. For example q=AxUx(Ti-To) TACM. I use TACM, CSDN-1, CSDM-2 and CSDM-3.
- Organize and summaries data in an understandable manner. Summary sheet,index calcs etc.

COURSE EVALUATIONS :

- Attendance and Participation — 25% of Total Mark
- Quizzes — 25% of Total Mark
- Homework — 25% of Total Mark
- Student Project — 25% of Total Mark

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GRADING :

- A 90 to 100
- B 80 t0 89
- C 70 to 79
- D 60 to 69
- E 50 to 59
- F 0 to 49

SYLLABUS:
The instructor reserves the right to make adjustments to this schedule, the topics covered, the assignments made, the evaluations required, or otherwise as may be need to effectively teach the material to be covered.

SESSION I
Energy, temperature, heat, sensible heat , latent heat, specific heat, steam tables, pressure, interpolation, ambient conditions, design conditions, design objectives, building dimensions effect on heat transfer and heating and ventilation design process.

SESSION II
Review of Session I and TACM chapter II. Effects of dimensions, material, and temperature difference on heat transfer. Heat transfer through homogeneous and composite materials, air spaces and surface films. Calculating over all heat transfer coefficients for walls roofs Etc. and heat flux. Infiltration. Application to class project.

SESSION III
Review of Session II. Application of heat transfer calcs to determine building heat loss for class project. Determining ventilation requirements. Start of student test project.

SESSION IV
Review of Session III. Closed piping systems, parallel piping systems, pressure drop calcs and application to hyronics piping. Hot water heating system Equipment. Boiler HP calc. Pump HP calc. Combustion air Requirements. Baseboard heaters. Develop hydronic system for class project. Discussion of student test project.

SESSION V
Review of Session IV. Air change method of ventilation. Heat removal ventilation. Air quality ventilation for hydronic heat systems. Hot air heating system with air quality ventilation. Properties of air. Ventilation air and hot air heat application to class project. Discussion of student test project.

SESSION VI
Review of Session V. Duct design and pressure calcs. Develop Duct for hydronic ventilation and hot air heat for Class Project. Discussion of student test project.

SESSION VII
Review of Session VI. Ventilation equipment: filters, heat exchangers, louvers, fire dampers, fans and fan laws. Using air properties and fan laws in fan laws. Discussion of student test project.

SESSION VIII
Heat recovery equipment. Review of Sessions I through VII. Discussion of student test project with emphasis on problems. Individual help if needed.

SESSION IX
Student test projects to be turned in. Q and A session on heating and ventilation.

SESSION X
Marks and Diplomas awarded. Student evaluations of instructor