

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE, ON
COURSE OUTLINE

COURSE TITLE: BUILDING SCIENCE
CODE NO.: PHY 226 SEMESTER: HI
PROGRAM: ARCHITECTURAL TECHNOLOGY
AUTHOR: M. URSELL
DATE: AUG/94 PREVIOUS OUTLINE DATED: AUG/92

APPROVED: *Mf* *Jt'-n*

TOTAL CREDITS HOURS: 64

PREREQUISITE(S): PHY126 , PHY125

L PHILOSOPHY/GOALS:

This course will introduce the student to energy analysis & conservation methods. The student will also design & layout various types of heating systems.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

Upon successful completion of this course the student will:

- 1) Be able to identify basic energy concepts & terminology
- 2) Be able to design & layout a hydronic heating system.
- 3) Be able to design & layout a forced air heating system
- 4) Conduct a heatloss analysis, including temperature gradients for a residential building.

III. TOPICS TO BE COVERED:

Approximate Time

- 1) Review of physics principles regarding heat flow in air and water.
- 2) Hydronic heating design & layout.
- 3) Forced Warm Air heating design & layout
- 4) Heatloss analysis.
- 5) Electric space heating principles of design & layout.

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IV. LEARNING ACTIVITIES/REQUIRED RESOURCES

11 Basic Physics review of heatflow in air and water.

Learning Activities:

Instruction & problem solving on:

- Heating terminology
- Heatflow
- Heat characteristics of air & water.

Resources:

Chapters 1³
Handouts & overheads

21 Design & layout of a Hydronic heating system.

Learning Activities:

Demonstration & discussion on:

- Heatloss calculations
- Hotwater heating systems & boilers
- Infiltration
- *U" factor calculations
- Construction of the radiation sheet
- Selection of the proper radiation
- TVpes of system layouts
- Gallonage, temperature drop, & head calculations
- Pipe sizing

Resources:

- Control of a hydronic heating system
- Chapter 7, & 8
- Handouts & overheads
- Trane Heating Manual

- 3) Design & layout of a forced air heating system.

Learning Activities:

Demonstration, instruction & design exercises on:

- General design recommendations
- Component selection
- Supply outlet design & layout
- Return outlet design & layout
- Supply & return trunk duct sizing & layout
- Control of forced air heating systems

Resources:

Chapter 6 & 13
Natural Gas Technolc^ Manual
H.RA. Digest
Handouts & overheads

- 4) Heatloss Analysis.

Learning Activities:

Instruction & research on:

- Temperature Gradient determination
- Heat loss Analysis
- Simple Payback calculations for construction upgrades

Resource:

Handouts & overheads

- 5) Electric Space heating.

Learning Activities:

Class instruction Sc demonstration on:

- Basic Electrical Safety Code regulations
- Selection of space heating components
- Layout

Resources:

Electrical Safety Code & Handouts

V. **EVALUATION METHODS:** (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS, ETC.)

A final grade will be derived as follows:

Attendance	10%
Assignments	30%
Tests	30%
Projects	<u>30%</u>
Total	100%

The grading system used will be as follows:

A+	90% - 100%
A	80% - 89%
B	70% - 79%
C	55% - 69%
R	Repeat

- 1) Assignments will be collected on dates specified and will not only be graded for correct solutions, but will also be checked for neatness and layout of work. **Late Assignments will not be accepted.**
- 2) Minimum acceptable grade for this course is 55%.
- 3) If at the end of the semester the overall mark is below 55%, then it will be up to the instructor whether or not a rewrite test will be granted. The criteria employed for arriving at that decision is class attendance, class participation and overall grade, which should be at least 45%.
- 4) In the case a rewrite is granted, it will be permitted only once, it will cover the entire course outline and will limit the maximum obtainable grade for the course to 60%.

VI. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon completion of the requirements of the Prior Learning Assessment Process (PLA) as defined in the Course Analysis Form provided with this course.

Vn. STUDENT RESOURCES

Mechanical & Electrical Systems for Construction By: Riley Shuttleworth
McGraw-Hill Book Company

In addition to the recommended course text, there are numerous books available in the library related to construction estimating.

Vm. SPECIAL NOTES

Students with special needs (*eg.* physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the Instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

IX. COURSE ANALYSIS SHEET (SEE ATTACHED)