

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Design & Drafting Technology Program
Revision Date: August 23, 2021

I. CATALOG DESCRIPTION

Course Number: DDRT1420
Course Title: Advanced Mechanical Systems Theory and Drafting
Prerequisite(s): DDRT1120, DDRT1207 and DDRT1320
Catalog Description: Methods of calculating heat loss and heat gain for commercial structures and the layout and sizing of ductwork systems. The course covers the production of working drawings of the mechanical system in commercial buildings.

Credit Hours: 3
Class Hours: 23
Lab Hours: 68
Total Contact Hours: 91

II. COURSE OBJECTIVES: *Course will:*

- A. Introduce terms associated with the commercial HVAC industry.
- B. Allow a better understanding of the information and calculations needed to produce a set of engineering drawings in the construction field.
- C. Produce drawings according to industry standards.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Understand the basic principles of commercial HVAC design.
 - 2. Determine static pressures, CFMs and duct sizes.
 - 3. Determine the condition of the air using a psychometric chart.
 - 4. Determine U-factors for different types of building construction.
 - 5. Determine the area of the different building materials.
 - 6. Layout a duct system.
 - 7. Determine the correct placement for the diffusers.
 - 8. Identify the different components of an air handling unit.
 - 9. Determine the heat loss of a commercial building.
 - 10. Determine the heat gain of a commercial building
 - 11. Calculate the heat loss and heat gain of additional building as assigned. Carrying out the projects from start to finish.
 - 12. Use the current version of AutoCAD and its associated software.
 - 13. Identify and use the HVAC symbols associated with the construction field.
 - 14. Layout diffusers and grilles for commercial buildings.
 - 15. Design and layout ductwork systems for commercial buildings.
 - 16. Design and layout air handling units for commercial buildings.
 - 17. Produce schedules required for the plans.
 - 18. Make changes as required by alterations in the building design
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #5: Analytical, Quantitative, and Scientific Reasoning
Outcome 4: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. CONTENT/TOPICAL OUTLINE

- A. Basic principles and terms
- B. Duct sizing
- C. Determining U-values
- D. Ductwork standards and layout
- E. Use of a psychometric chart
- F. Air handling equipment and systems
- G. Diffuser sizing and layout
- H. Heat loss calculations
- I. Heat gain calculations
- J. Basic ductwork drawing
- K. Arch. Tech Classroom Reheat drawing
- L. SKP Building VAV
- M. Corrections for selected projects

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): Stein/Reynolds, *Mechanical and Electrical Equipment for Buildings*, (Refer to CID and/or instructor for current edition)
- B. Other Resources: Trane Ductulator and *Carrier Psychometric Chart*

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lecture
 - 2. Classroom discussion
 - 3. Videos
 - 4. Lab Assistance

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Attendance and participation
 - 2. Daily assignments
 - 3. Written exams and/or quizzes
 - 4. Performance and observational assessment

VIII. SPECIFIC COURSE REQUIREMENTS

- A. Students must meet all of the following:
 - 1. Achieve passing grade of 60% or higher, based on SCC grading scale.
 - 2. Submit own work. Students turning in calculations or homework by someone other than themselves will receive a grade of 0% and will be referred to the Dean of Students for further disciplinary action.