**M.E. Rinker, Sr. School of Construction Management**

**University of Florida**

**Semester Course Outline**

**BCN 4510 - Mechanical Systems**  Spring 2024 4 Credits

**Professor:** Mark Russell, PhD, PE, 330 Rinker Hall, russ1307@ufl.edu (352)273-1172

**Prerequisites:** PHY 2054, PHY 2054L, BCN 3521C

**Method:** 4 lecture hours and 1 laboratory hour per week

**Description:** Principles and practices of year-round air conditioning for the building contractor will be

explored. Basic design principles and problems will be presented with emphasis on considerations of

concern to the general contractor.

**Recommended Texts:**  Mechanical and Electrical Systems in Buildings, by Richard R. Janis and William K.Y. Tao, Perason Prentice Hall Publishers, latest edition

**Suggested References:** Environmental Systems Technology by W. David Bevirt, National Environmental Balancing Bureau, 1991.

**Keywords:** Mechanical Systems, Heating and Cooling Calculations, Air Distribution Systems

**Objective:** This course includes heating and cooling load analysis; psychrometrics; fan and system curves; equipment sizing, selection and location; reading mechanical drawings; air handling systems; refrigeration system fundamentals; and plumbing.

**Student Learning Outcomes:**

**7.** Analyze construction documents for planning and management of construction processes (CLO 6).

**8.** Analyze methods, materials, and equipment used to construct projects (CLO 2).

**15.** Understand construction quality assurance and control (CLO 1 & 4).

**18.** Understand the basic principles of sustainable construction (CLO 7).

**20.** Understand the basic principles of mechanical, electrical, and piping system (CLO 3 & 5).

**Course Learning Outcomes:**

1. Identify conditions that constitute a comfortable environment, (ACCE SLO 15).
2. Demonstrate knowledge of residential and commercial plumbing systems, (ACCE SLO 8).
3. Explain the components and operation of direct expansion and chilled water equipment (ACCE SLO 20).
4. Locate the properties of air with a psychrometric chart , (ACCE SLO 15).
5. Understand the operation of air distribution systems and be able to interpret and extract information from codes and standards. (ACCE SLO 20).
6. Interpret mechanical specifications, drawings, and submittals (ACCE SLO 7)
7. Discuss energy efficiency measures to reduce a building’s heating and cooling load (ACCE SLO 18).

**ASSESSMENT METHODS**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment** | **CLO**  **1** | **CLO**  **2** | **CLO**  **3** | **CLO**  **4** | **CLO**  **5** | **CLO**  **6** | **CLO**  **7** |
| Test 1 | X |  |  | X |  |  |  |
| Test 2 |  |  |  |  |  |  | X |
| Test 3 |  |  | X |  | X |  |  |
| Test 4 |  |  |  |  |  | X |  |
| Test 5 |  | X |  |  |  |  |  |

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| **Assessment** | **Target** |
| Tests | At least 80% receive a grade of B- or better |
|  |
| Lab | Successful completion of 90% of lab questions |

**Canvas**

This course utilizes Canvas as a repository for all course material including lecture notes, homework, and grades. It is the student’s responsibility to take advantage of the university resources to learn how to utilize Canvas.

**Grading Policy**

Grades for this course will be determined by a combination of exams and labs. No late assignments will be accepted. There will be no make-up work provided, unless there is a documented medical emergency. Please keep in contact with the Course Instructor through the e-Learning email system about anticipated conflicts with submitting work in a timely manner. Flexibility is much more feasible prior to submission deadlines than after the fact.

**Grading System**

5 tests @ 180 points each = 900 points

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| --- | --- |
| Lab attendance: 10 labs @ 10 points each | = 100 points |
| Total | 1000 points |

**Grading**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Letter Grade | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | E |
| Numeric points | 930-1000 | 900-  929.9 | 870-  899.9 | 830-  869.9 | 800-  829.9 | 770-  799.9 | 730-  769.9 | 700-  729.9 | 670-  699.9 | 630-  669.9 | 600-  629.9 | 0-  599 |
| Quality Points | 4.0 | 3.67 | 3.33 | 3.0 | 2.67 | 2.33 | 2.0 | 1.67 | 1.33 | 1.0 | 0.67 | 0.0 |

**UF Policies:**

**University Policy on Accommodating Students with Disabilities (Required):** “Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc](http://www.dso.ufl.edu/drc) ) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.”

**University Policy on Academic Conduct:** UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Class Demeanor or Netiquette:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. [Describe what is expected and what will occur as a result of improper behavior [See Sample Netiquette Document](http://teach.ufl.edu/resources/syllabus-templates/)]

**Getting Help:**

For issues with technical difficulties for Canvas, please contact the UF Help Desk at:

* http://helpdesk.ufl.edu
* (352) 392-HELP (4357)
* Walk-in: HUB 132

Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from the Help Desk when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

* Counseling and Wellness resources
* Disability resources
* Resources for handling student concerns and complaints
* Library Help Desk support

(Required) Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

**Student Evaluations**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.