

Instructor: Michael Fairchild

FALL 2018

COURSE SYLLABUS

The University of Texas at Arlington

College of Engineering

Department of Civil Engineering

**CM 3331 & AREN 3331 – Mechanical & Electrical Systems
(3 Credit Hours)**

Name of Instructor: Michael Fairchild, AIA, NCARB, LEED® AP

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Office Hours: Monday-Friday 1:00 PM until 2:00 PM

Monday-Wednesday 3:00 PM until 4:00 PM

Tuesday-Thursday 11:00 AM until 12:00 PM

Tuesday-Thursday 1:00 PM until 3:00 PM

Course Number, Section Number, and Course Title:

CM 3331 – Mechanical, Electrical & Plumbing Systems

AREN 3331 – Mechanical, Electrical & Plumbing Systems

- Sections 001, Geoscience 109

Time and Place of Class Meetings: Tuesday & Thursday, 9:30 AM to 10:50 AM

Teaching Assistant (TA): TBD

Description of Course Content:

An overview of mechanical and electrical systems with a major emphasis on the various components and types of plumbing, air conditioning, heating, ventilation, and electrical systems, plus design and testing requirements for each system and types of HVAC controls.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- Identify and describe the various plumbing systems incorporated into building designs.
- Identify, describe and distinguish between the key components of all plumbing systems supply, drain, waste and vent piping.
- Name and explain basic properties of fluid flow of a building's plumbing system: flow rate, velocity, pressure and pressure drop.
- Understand the need for testing and inspection of plumbing systems.
- Identify and describe the various types of heating, ventilation and cooling systems, including forced-air heating, steam heating, air conditioning and heat pumps, plus comprehend the principles of refrigeration.
- Understand how temperature, humidity, enthalpy, volume of air and the psychrometric chart affect the design of the heating and cooling systems.
- Name and define common electrical terminology including voltage, amperage, Ohm's law, resistance and ampacity.
- Identify and describe types of testing instruments, measurements and identify safety issues.
- Interpret design and detailing information of building electrical system components including switches, outlets, panels, switchgear, cabling, service entrances and transformers.

Specific Course Objectives

- Compute the minimum required size of distribution lines of a building's plumbing systems.
- Calculate heating and cooling loads impacting buildings and sizing of the HVAC equipment.
- Calculate energy and cost of operation of various types of electrical equipment.

Requirements: Prerequisite: Grade of C or better in PHYS 1442 or Permission of the CE Chair or Admission to the CE Professional Program.

Required Textbook: Mechanical & Electrical Systems for Construction Managers, 3rd Edition, published by American Technical Publishers, Inc., ISBN 978-0-8269-9363-2

Descriptions of major assignments and examinations with due dates: There will be two exams, plus the final exam (which will be comprehensive), one project report, and homework assignments. See Course Outline for specific dates.

Grading Policy: Grades will be determined according to the following scale (the grading scale may be lowered at the discretion of the instructor, but will not be raised):

Grade	% Required
A	90 -100
B	80-89
C	70-79
D	60-69
F	Less than 60

Students will be required to accumulate points from the following:

Daily Quizzes	20%
Hourly Exams (2)	40%
Homework	15%
<u>Final Exam (Comprehensive)</u>	<u>25%</u>
Total	100%

Make-up Exam Policy: All students must take the exams. Only extenuating circumstances will be accepted as excuse for missing the exam. Health related excuses require medical reports and the signature of a physician that provided treatment.

Grade Grievance Policy: Refer to UTA Catalog for more information.

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor for this course, I will take attendance for each class. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping

classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

Title IX Policy: The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu.*

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>. Faculty are encouraged to discuss plagiarism and share the following library tutorials <http://libguides.uta.edu/copyright/plagiarism> and <http://library.uta.edu/plagiarism/>. Additional information is available at <https://www.uta.edu/conduct/>.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and

information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

Engineering Librarian:

Sylvia George-Williams, Engineering Librarian

UT Arlington Science & Engineering Library

Mailing address: B03B Nedderman Hall, Arlington, TX 76019. Phone: (817) 272 7519, Email: sylvia@uta.edu

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Laptop use in the classroom: In order to minimize distraction, the use of laptop and/or any other digital device (except standard scientific calculators) in the classroom is NOT allowed.

Emergency Exit Procedures: (Applies to face-to-face courses only.) Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, look for illuminated EXIT signs. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

CM 3331 & AREN 3331 – Mechanical & Electrical Systems
TENTATIVE COURSE OUTLINE

Day	Date	Topic	Reference	Assignments Due
Week 1				

Thursday	August 23	Course Overview		
Week 2				
Tuesday	August 28	MEP Systems Overview	Chapter 1	
Thursday	August 30	Plumbing Materials	Chapter 2	
Week 3				
Tuesday	Sept. 4	Sanitary, Vents, Storm Piping	Chapter 3	
Thursday	Sept. 6 (census date 9/7/18)	Sizing Sanitary, Vent & Water Piping	Chapters 4 & 5	
Week 4				
Tuesday	Sept. 11	Plumbing Fixtures & Appliances	Chapter 6	
Thursday	Sept. 13	Testing & Inspections	Chapter 7	
Week 5				
Tuesday	Sept. 18	HVAC Comfort	Chapter 8	
Thursday	Sept. 20	Psychrometrics	Chapter 9	Psychrometrics Homework
Week 6				
Tuesday	Sept. 25	Forced Air & Steam Heating Systems	Chapters 10 & 11	
Thursday	Sept. 27	Refrigeration Principles	Chapter 12	
Week 7				
Tuesday	October 2	Air Conditioning & Heat Pumps	Chapters 13 & 14	
Thursday	October 4	Building Controls	Chapter 15	
Week 8				
Tuesday	October 9	Heating & Cooling Loads	Chapter 16	
Thursday	October 11	EXAM #1 Review		
Week 9				
Tuesday	October 16	EXAM #1		
Thursday	October 18	HVAC Load Calculations	Chapter 17	
Week 10				
Tuesday	October 23	HVAC Load Calculations	Chapter 17	HVAC Design Project
Thursday	October 25	Forced Air & Hydronic Systems Design	Chapters 18 & 19	
Week 11				
Tuesday	October 30	Review HVAC Design Project		
Thursday	Nov. 1 (last day to drop 11/2/18)	Electrical Principles, Tools & Safety	Chapter 20	
Week 12				
Tuesday	Nov. 6	Basic Quantities, Testing, Measurements	Chapters 21 & 22	
Thursday	Nov. 8	Ohm's Law, Power Formulas + Elect. Plans & Connections	Chapter 23 & 24	
Week 13				
Tuesday	Nov. 13	Switches, Receptacles, Cabling	Chapters 25 & 26	

Thursday	Nov. 15	Service Entrances & Transformers	Chapters 27 & 28	
Week 14				
Tuesday	Nov. 20	Review for Exam #2		
Thursday	Nov. 22	THANKSGIVING		
Week 15				
Tuesday	Nov. 27	EXAM #2		
Thursday	Nov. 29	Resistance, Inductance, Capacitance & Commercial Circuits	Chapters 29 & 30	
Week 16				
Tuesday	Dec. 4	Final Exam Review		
Week 17				
Dec. 11, 2:00 PM – 4:30 PM		FINAL EXAM (Comprehensive) – verify date & time		

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – Michael W. Fairchild

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911.

NOTICE TO ON-LINE STUDENTS:

1. Students taking this course on-line must make arrangements for taking exams via an educational institution and administered by a professional proctor, OR, on-line students may take the exams with the in-class students.
2. If an on-line student is taking an in-class course that has conflicting Final Exam times, the student must make arrangements to take both exams by rescheduling one of the exams.