MEEN 4332  
Fundamentals of Air Pollution Engineering  
Fall 2023

**Course description:**  
Fundamental theories of air pollution and atmospheric science. Air pollution causes and impacts; atmospheric chemistry and physics; meteorology; and an introduction to air quality models. Control technology of particulate and gaseous air pollutants; process design variables; and industrial and engineering applications of control technologies.

**Prerequisite(s):**  
MEEN 3110 or consent of department.

**Textbook:**  

**Course objectives:**  
Course objectives are: (1) to provide students with fundamental concepts of air pollution science and engineering; (2) to provide an in-depth review of sources of air pollution and engineering controls; (3) to provide case-study based analyses of environmental impacts and applications related to energy industries.

**Student learning outcomes:**

1. Knowledge of the fundamental concepts of air pollution science and engineering  
2. Knowledge of global and societal issues related to air pollution  
3. Ability to identify, formulate, and solve engineering problems  
4. Ability to evaluate and use principles of stoichiometry, chemical kinetics, and thermodynamics  
5. Knowledge of industrial practices for environmental control  
6. Performing on a team-based design evaluation project

**Course contents:**

1. **Air Pollution Overview**  
   a) Introduction  
   b) Atmospheric Chemistry and Physics  
   c) Air Pollution and Meteorology  
   d) Air Pollution Impacts  
   e) Air Quality Monitoring and Measurements  
   f) Trends  
   g) Rules, Laws, Regulations and Policies

2. **Particulate Matter Control**  
   a) Introduction  
   b) Cyclones  
   c) Electrostatic Precipitators
d) Fabric Filters

e) Particulate Scrubbers

3. **Gaseous Pollutant Control**
   a) Introduction
   b) VOC Incinerators
   c) Gas Adsorption
   d) Gas Absorption
   e) Biological Control of VOCs and Odors
   f) Control of Sulfur Oxides
   g) Control of Nitrogen Oxides

4. **Other Sources and Controls**
   a) Control of Mercury Compounds
   b) Control of Greenhouse Gases
   c) Mobile Source Control Technologies

5. **Case Studies in Air Pollution Control Engineering**
   a) Urban and Industrial Pollution

---

**Instructor:**
Dr. Kuruvilla John
Professor
F115Q
Department of Mechanical Engineering
University of North Texas
Denton, Texas 76207
Kuruvilla.John@unt.edu
(940) 369-8801

**Course format:**
3 hours of lecture per week; MW 4:00 - 5:20 p.m.

**Office hours:**
By appointment

**Grading:**
- Class participation: 10%
- Homework: 30%
- Unit I exam: 15%
- Unit II exam: 15%
- Unit III exam: 15%
- Term project: 15%

**Total: 100%**
Disabilities Accommodation:
The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one’s specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at http://disability.unt.edu.

Academic Integrity Standards and Consequences:
According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Emergency Notification & Procedures:
UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Acceptable Student Behavior:
Student behavior that interferes with an instructor’s ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at deanofstudents.unt.edu/conduct.