**College:** CEIAS

**Department:** CECMEE

**Course:** DesignCalculations for Air Pollution Controls

**Term/Year/Times/Location:** Fall 2019, XUST, Xi’an, China

**Total Course Hours:**  27.5

**Mode of Instruction:** Lecture and in-class work

**Instructor’s Name:** Terry E. Baxter

**Instructor’s Contact Information:** E-mail: terry.baxter@nau.edu

**Course Description:**  This is a graduate-level design-based course. The scope of this course covers the design calculations for the conventional control of particulate matter and gaseous pollutants, and auxiliary process equipment. Students are expected to develop spreadsheets that can handle design calculations.

**Course Student Learning Outcomes:** Upon successfully completing this course, students will be able to:

1. Understand basic design calculations for conventional air pollution control devices.

2. Use a spreadsheet as a tool for performing design calculations.

3. Understand the steps necessary for completing complex design problems for control of particulate matter from a cement kiln and for control of odors from a wastewater treatment plant.

**Tentative Schedule** The following schedule presents the intended sequencing of topics and activities for this course

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| **Day** | **Time ,Topic, and Activities** | **Cumulative Time** |
| 12/27  (F) | 10:00 to 10:30 Course Introduction  10:30 to 11:00 Review Properties of Gases and Vapors  11:00 to 12:00 Adsorption (carbon)  14:00 to 16:00 Adsorption Design Calculations | 0.5 hrs.  1.0 hrs.  2.0 hrs.  4.0 hrs. |
| 12/28  (S) | 8:00 to 10:00 Absorption  11:00 to 12:00 Absorber/Scrubbing Design Calculations  14:00 to 18:00 Absorber/Scrubbing Design Calculations | 6.0 hrs.  7.0 hrs.  11.0 hrs. |
| 12/30  (M) | 9:00 to 10:00 Review Properties of Particulate Matter and Particle Distributions  10:00 to 12:00 Cyclone Separators (Classical) and Design Considerations  14:00 to 16:00 Cyclone Design Calculations (spreadsheet)  16:00 to 17:00 Review of Ducts & Fans (Pressure Loss & Sizing) | 12.0 hrs.  14.0 hrs.  16.0 hrs.  17.0 hrs. |
| 12/31  (T) | 8:00 to 12:00 Particle Control Problem  14:00 to 16:00 Particle Control Problem (Finish) | 21.0 hrs.  23.0 hrs. |
| 1/2  (Th) | 10:00 to 12:00 Case Study: Preliminary Design of Odor Control at Los Angeles Hyperion WWTP  14:00 to 16:00 Case Study: Preliminary Design of Odor Control at Los Angeles Hyperion WWTP (Finish)  16:00 to 16:30 Discussion and Course Evaluation | 25.0 hrs.  27.0 hrs.  27.5 hrs. |