DATE OF LAST REVIEW : 7/18/2013
CIP CODE: 15.0508
SEMESTER: Departmental Syllabus
COURSE TITLE: Air Monitoring Techniques
COURSE NUMBER: HZMT-0150
CREDIT HOURS: Two (2)
INSTRUCTOR: Departmental Syllabus
OFFICE LOCATION: Departmental Syllabus
OFFICE HOURS: Departmental Syllabus
TELEPHONE: Departmental Syllabus
EMAIL: Departmental Syllabus

KCKCC issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE(S): None

REQUIRED TEXT AND MATERIALS:
Please check with the KCKCC bookstore, http://www.kckccbookstore.com/, for the required texts for your particular class.

COURSE DESCRIPTION:
Emphasis will be on the introduction of monitoring hazardous emissions opacity for industry, legal standards and regulations, regulating authorities, and field applications of opacity monitoring.

METHOD OF INSTRUCTION:
A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:
The course outline is indicated below and is subject to change as course development dictates.

I. Introduction
   A.) Terminology
   B.) Federal Opacity Standards
   C.) State Opacity Standards

II. History of Opacity Measurement
   A.) Ringelmann
   B.) Early Legal Refinement
C.) Equivalent Opacity
D.) Legal Cases

III. Opacity Measurement Principals
A.) Working Definitions of Opacity and Impact of Particle Size
B.) Line of Vision
C.) Sky Conditions
E.) Comparison of Method 9 and Method 22

IV. Documentation
A.) Required by Method 9
B.) Plume Types
C.) Sky Conditions
D.) Visible Emissions Observation Form
E.) Completed VEO Form

V. Equipment
A.) Descriptions
B.) Field Equipment Kit

VI. Field Operations
A.) Pre Observations Procedures
B.) Required 140 Degree Sector
C.) Perpendicular Line of Sight
D.) Steam Plume Classification
E.) Adjust Field Location

VII. Calculations
A.) Relationship of Opacity and Transmittance
B.) Slant Angle Calculation
C.) Slant Angle Calculation Table
D.) Steam Plume Modeling Chart

VIII. Quality Assurance Audit
A.) Vertical Sun Angle

EXPECTED LEARNER OUTCOMES:
A. The student will be able to explain smoke density and opacity.
B. The student will be able to iterate the history of legal regulations of industrial emissions.
C. The student will be able to define opacity measurement principals.
D. The student will be able to show how to accurately document measurement procedures.
E. The student will be able to discuss equipment involved in the measurement process.
F. The student will be able to discuss field operations.
G. The student will be able to determine how to accurately calculate opacity measurements.
H. The student will discuss the importance of quality assurance audits.

COURSE COMPETENCIES:
The student will be able to explain smoke density and opacity.

1. The student will be able to define Title V of the 1990 Federal Clean Air Act.
2. The student will be able to explain the definition of opacity of emissions.
3. The student will be able to discuss regulatory standards of hazardous air emissions.
4. The student will be able to demonstrate air monitoring techniques, evaluation and predictions of chemical releases.
5. The student will be able to understand the result of CFR Title V violations.

The student will be able to iterate the history of legal regulations of industrial emissions.
The student will be able to discuss the history of visual opacity evaluation.

The student will be able to iterate the Ringelman concept.

The student will be able to demonstrate how to use Method 9 Promulgation.

The student will be able to demonstrate how to use Method 22 Promulgation.

The student will be able to discuss various court cases involving air quality.

The student will be able to define opacity measurement principals.

The student will be able understand opacity measurement principles.

The student will be able to calculate light flux of a plume.

The student will be able to demonstrate how to calculate opacity values.

The student will be able to demonstrate how to choose correct backgrounds for opacity evaluation.

The student will be able to compare Method 22 with Method 9.

The student will be able to show how to accurately document measurement procedures.

The student will be able to understand the required documentation for Method 9.

The student will be able to understand the required documentation for Method 22.

The student will be able to understand the required documentation for opacity evaluation.

The student will be able to demonstrate how to properly fill out the visible emission observation form.

The student will be able to discuss equipment involved in the measurement process.

The student will be able to choose the proper equipment needed to evaluate opacity.

The student will be able to develop a field kit for smoke plume evaluation.

The student will discuss the importance of photo-documentation.

The student will discuss the importance of video documentation.

The student will be able to discuss field operations.

The student will be able to outline proper procedures for field operations.

The student will be able to outline pre-observation procedures.

The student will be able to review permit conditions, requirements and application.

The student will be able to calculate the proper sun position for observation.

The student will be able to determine the direction of plume travel.

The student will be able to determine how to accurately calculate opacity measurements.

The student will be able to calculate the opacity transmittance relationships.

The student will be able to determine the method 9 data reduction.

The student will be able to correct for the slant angle in the calculation of opacity.

The student will be able to evaluate a condensed water vapor plume.

The student will discuss the importance of quality assurance audits.

The student will be able to describe a quality assurance audit.

The student will be able to discuss regulations for recertification.

The student will be able to discuss opacity readings representative of actual conditions.

ASSESSMENT OF LEARNER OUTCOMES:
Assessment methods may include, but are not limited to, the following: Homework, Assignments, Quizzes, Class Participation, Chapter Tests, and Final Exam. The grading scale and the process for calculating the course grades are to be determined by the individual instructors. This information will be included in each instructor’s syllabus.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.
Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the director of the Academic Resource Center in Room 3354 or call 288-7670.