DATE OF LAST REVIEW: 02/2013

CIP CODE: 15.0508

SEMESTER: Departmental Syllabus

COURSE TITLE: Hazardous Materials Industrial Processes

COURSE NUMBER: HZMT-0285

CREDIT HOURS: 3

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: 913-334-1100

PREREQUISITE(S): None

REQUIRED TEXT(S): Please see bookstore for current textbook(s) and other required material.

COURSE DESCRIPTION:
This industrial process course will familiarize the student with five common categories of industrial process facilities. Using the techniques developed in this course, the student will learn how to familiarize him or herself with a variety of industrial processes from a hazardous materials focal point.

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 or community needs dictate:

1. Section 1
   A. Make a material balance of flow of materials for a continuous industrial process operation
   B. Assess points in the operation which could be altered in order to increase worker health and safety, ensure regulatory compliance, and reduce industrial liability and costs. Alterations may include: raw material substitution, process modification, etc.
   C. Do the same as described above, but on a unit operations processing basis for batch or job shop operations.
   D. Set up a material balance for a unit operation of a selected community college, (i.e. the print shop, auto garage, or chemistry lab).
   E. Organize the data obtained in the activity listed above, in a logical manner or on a computer database.
F. Using information from MSDS sheets, determine which streams deserve special attention in terms of their hazard potential.

2. Section 2
   A. Obtain information on and understand the various environmental laws and regulations that affect water (effluent) discharges, air emissions, and solid and hazardous waste streams from an industrial facility.
   B. Obtain information on and understand the various "Right- to-Know" (RTK) hazardous materials regulations, OSHA Hazard Communication Standard state employee RTK regulations, and the SARA Title III ("Community Right- to- Know") regulations.
   C. Understand how these regulations affect external plant material and product flows, internal plant material flow and handling, and effluents, losses, waste streams and emissions.

3. Section 3
   A. Explain the basic processes of the electroplating, metal finishing and printed circuit board industries.
   B. Identify specific hazardous materials and environmental regulations that pertain to this industry.
   C. Recognize specific hazardous materials and hazardous waste problems in the industry, and by extension and analogy, other problems as they may arise.
   D. Look at case histories for hazardous material management and opportunities for hazardous waste minimization and source reduction in this industry.

4. Section 4
   A. Identify and be familiar with at least the basic unit operations of petroleum refining and chemical production.
   B. By analogy and reference (knowing where to obtain the material) be able to become knowledgeable of any process in the industry.
   C. Be familiar with specific regulations and constraints that pertain to the industry.
   D. Given various case studies, be able to formulate an approach to hazardous material or waste minimization, source reduction, or recycling.

5. Section 5
   A. Identify and be familiar with at least the basic processing operations of steel production, with some brief introduction to specialty alloy production.
   B. By analogy and reference (knowing where to obtain the material), be able to become knowledgeable of any process in the ferrous metals industry.
   C. Be familiar with specific regulations and constraints that pertain to the industry.
   D. Given various case studies, formulate an approach to hazardous material or waste minimization, source reduction, or recycling.

6. Section 6
   A. Recognize unit operations and flow of materials within a general manufacturing industry.
   B. By analogy and reference (knowing where to obtain the material), be able to become knowledgeable of any general manufacturing process encountered.
   C. Be familiar with specific regulations and constraints that pertain to the industry.
   D. Given various case studies, formulate an approach to hazardous material or waste minimization, source reduction, or recycling.

7. Section 7
   A. Recognize unit operations and flow of materials within a printing shop.
   B. By analogy and reference (knowing where to obtain the material), be able to become knowledgeable of any printing or reprographic process encountered.
   C. Be familiar with specific regulations and constraints that pertain to the industry.
   D. Given various case studies, formulate an approach to hazardous material or waste minimization, source reduction, or recycling and recovery.

EXPECTED LEARNER OUTCOMES
1. To teach the student general principles of flow of materials analysis in an industrial process which includes exposure to five general types of industrial operations that are common in the Midwest.
2. To enable the student to serve confidently in any industrial situation by supplying decision-makers (plant engineers, plant managers, legal staff, industrial hygienists, etc.) with adequate and accurate technical data, recommendations, and conclusions.
3. Guide the facility to compliance with all hazardous materials and hazardous waste regulations, federal, state and local.
4. Protect worker and community's health and safety.
5. Save the company money.

COMPETENCIES
1. The student should be able to describe the five general types of industrial processes presented and have the resources to become quickly acquainted with unfamiliar industrial processes.
2. The student should be able to complete a material balance for those industries for which it is possible and practical.
3. The student should be able to identify those industries for which a material balance is neither possible, practical, extremely difficult and/or meaningless; be prepared, nevertheless, to compile a systematic record of material flow, based on unit operations or assumptions.
4. The student should be able to develop, from your data, an assessment of the hazard potential of raw materials entering the facility.
5. The student should be able to from process knowledge, prepare recommendations for either raw material substitution, process changes, or other recommendations that will eliminate or reduce hazard potential from these substances or formulations.
6. The student should be able to from process knowledge, determine the points in an industrial process in which innocuous or relatively harmless raw materials might be changed into a hazardous material or waste; be prepared to make recommendations to eliminate hazard potential from this source.
7. The student should be able to from a material balance and/or process knowledge, be prepared to identify and quantify those toxic materials that might be released in the facility's air emissions; make recommendations, with other support staff or decision-makers, to either prevent these emissions or control them.
8. The student should be able to from a material balance and/or process knowledge, be prepared to identify and quantify those toxic materials that might be released in the facility's after (effluent or wastewater) emissions; make recommendations with other support staff or decision-makers, to either prevent these releases or control them.
9. The student should be able to from a material balance and/or process knowledge, be prepared to identify and quantify those toxic materials that might be released in the facilities solid and/or hazardous waste stream; make recommendations with other support staff or decision-makers to either prevent these releases or control them.
10. The student should be able to write a comprehensive, organized technical report on the hazardous material and hazardous waste situation in an industrial facility including conclusions and recommendations to technical staff, management, and decision-makers for reduction, mitigation or elimination of hazard potential to employees, the community and the environment.
11. The student should be able to give an oral presentation of the report in a succinct and understandable manner to facility staff, decision-makers, and interested outside or community audiences.
12. The student will outline the boiler operation process.
13. The student will explain how steam is used in industrial processes.
14. The student will outline how compressed air is utilized in industrial processes.
15. The student will discuss hydraulic operations in industrial processes.
16. The student will explain warehouse safety.
17. The student will explain forklift operations.
18. The student will explain lock out – tag out procedures.
19. The student will outline electrical hazards in industrial environments.
20. The student will outline common fire hazards.
21. The student will explain industrial fire prevention programs.
22. The student will discuss fleet drivers safety.
23. The student will address high volume warehouse operations.
24. The student will explain inventory control processes.
25. The student will outline industrial insurance decisions.
26. The student will discuss management processes and techniques.
27. The student will outline common warehouse hazards.
28. The student will explain how to minimize losses in disasters.
29. The student will explain the processes in recordkeeping.
30. The student will outline the processes utilized in waste control.

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 at (913) 288-7670 V/TDD.