SYLLABUS

DATE OF LAST REVIEW: 02/2013

CIP CODE: 24.0199

SEMESTER: Mar-13

COURSE TITLE: Forensic Science Analytical Techniques

COURSE NUMBER: CHEM-0201

CREDIT HOURS: 3

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):
CHEM-0112, College Chemistry II and Lab or concurrent enrollment.

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

COURSE DESCRIPTION:
This course is designed for the student who will be a science major in the field of Forensic Science. It starts with an introduction to the role of the expert witness and emphasizes throughout proper procedures for the handling of evidence. It incorporates three major laboratory processes within the criminal investigative processing of evidence. The principle and laboratory techniques of FT-IR, GC/MS and Electrophoresis will be covered in relationship to Forensics.

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:

I. The Expert Witness
   A. Role
   B. Qualifications
   C. Traits, Professional Ethics
   D. Rules of Evidence
E. Evidence Handling Procedures
F. Prerogatives
G. Basic Terminology

II. Theory of Spectrometry
   A. Properties of light and the electromagnetic spectrum
   B. Types of spectroscopy
   C. Interaction of electromagnetic radiation with samples

III. FT-Infrared Spectroscopy
   A. Theory behind FT-IR
   B. FT-IR Methods/Use
   C. Analysis of Forensic Samples
   D. Identification of Samples
   E. Trouble Shooting the Instrument

IV. Gas Chromatography
   A. Basic Principles and Methods of chromatography
   B. The most common detection methods used in gas chromatography
   C. Gas chromatography methods
      1. Techniques for the introduction of samples
      2. Standards
      3. Trouble Shooting the Instrument

V. Gas Chromatography/Mass Spectrometry
   A. Theory behind GC/MS
   B. GC/MS Methods
      1. Sample Preparation
      2. Sample Dilution
      3. Standards
      4. Identification of Samples
      5. Trouble Shooting the Instrument

VI. DNA Sample Analysis
   A. Polymerase Chain Reaction
   B. Genetic Markers
   C. Restriction Fragment Length Polymorphism
      1. Restriction Enzymes
      2. Electrophoresis
      3. Autoradiography/Luminescence Techniques

EXPECTED LEARNER OUTCOMES:
A. The learner will demonstrate an understanding of the role of an expert witness.
B. The learner will demonstrate the proper use of the FT-IR for sample identification.
C. The learner will demonstrate the proper use of the GC-MS for sample identification.

COURSE COMPETENCIES:
1. The learner will be able to demonstrate an understanding of the role of an expert witness.
2. The learner will be able to demonstrate knowledge of the qualifications of an expert witness.
3. The learner will be able to demonstrate and use the ethical principles of an expert witness.
4. The learner will be able to demonstrate knowledge of the rules of evidence.
5. The learner will be able to demonstrate an understanding of basic legal terminology.
6. The learner will be able to handle and document samples for testing in a legally acceptable manner.
7. The learner will be able to discuss electromagnetic radiation in terms of its interaction with matter.
8. The learner will be able to demonstrate the proper use of the IR spectrometer
9. The learner will be able to develop methods for the preparation of a sample on the FT-IR.
10. The learner will be able to develop methods for the running of a sample on the FT-IR.
11. The learner will be able to interpret IR spectra of simple organic compounds.
12. The learner will be able to trouble shoot problems with the FT-IR.
13. The learner will be able to demonstrate the proper use of the GC-MS.
14. The learner will be able to develop methods for the preparation of a sample on the GC-MS.
15. The learner will be able to develop methods for the running of a sample on the GC-MS.
16. The learner will be able to interpret GC-MS spectra of simple organic compounds.
17. The learner will be able to trouble shoot problems with the GC-MS.
18. The learner will be able to predict the IR spectra of simple organic compounds.
19. The learner will be able to predict the MS of simple organic compounds.
20. The learner will be able to discuss the technique/theory of the PCR.
21. The learner will be able to use PCR methods for the amplification of DNA samples.
22. The learner will be able to demonstrate an understanding of the use of restriction enzymes.
23. The learner will be able to demonstrate the ability to prepare gel electrophoresis samples.
24. The learner will be able to demonstrate the ability to run gel electrophoresis samples.
25. The learner will be able to demonstrate the ability to use Luminescence/Autoradiography detection procedures.

**ASSESSMENT OF LEARNER OUTCOMES:**
The student will be evaluated by means of classroom participation, homework problems, exams, quizzes, and the final exam.

**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 Rm. 3354 or call at: 288-7670.