SEMESTER AT SEA COURSE SYLLABUS

**Voyage: Fall 2013**
**Discipline: Chemistry 2720**
**Course Title: Forensic Science and the Criminal Justice System**
**Lower Division**
**Faculty Name: Ralph Allen, Professor of Chemistry**

**Pre-requisites**: A year of chemistry or AP credit as a perquisite.

**COURSE DESCRIPTION**

**As societies developed it was recognized that protection of the individual's life and property required a system of laws, enforcement, and punishment. As the methods of defining criminal acts evolved, the roles of different individuals in the justice system evolved. One of the most important modern elements in the criminal justice system has been the contributions of the scientist. This course will trace the evolution of the criminal justice system in the United States with particular attention to the role of the scientific expert witness. From the times when photographs were not considered as reliable evidence the role of the scientist has increased in helping to identify and catch criminals and ultimately to assist jurors (or judges) determine the guilt or innocence of an individual at trial. While a number of characteristics have been used in the past to identify criminals, the advent of characterizing an individual's DNA has dramatically changed the role of the forensic scientist. This course will trace the evolution of these testing methods and the work that was necessary for them to be accepted as scientifically reliable. Other scientific methods of identifying elements of a crime or for use as "class" evidence will be considered as well. In addition to lectures, the class will utilize cooperative learning as they work in groups or teams to more carefully explore how a forensic scientist works in the criminal justice system (including a mock trial)**

**COURSE OBJECTIVES:**

**After taking this course the student will better understand the criminal justice system and the unique role of the forensic scientist. The student will have an understanding of some of the methods used to prove the elements of a crime such as the positive identification of a substance as one that is specifically banned by law. They will also understand methods used to define common materials into a class and the use of statistics in using class evidence to identify and convict a criminal. The student will also understand how DNA is analyzed and how biostatistics is utilized to define the probability that the biological evidence links a particular individual to a crime or crime scene. Students will understand the importance of quality control and assurance in the collection and analysis of evidence.**

**REQUIRED TEXTBOOK**

AUTHOR: Sheila Jasanoff
TITLE: Science at the Bar

PUBLISHER: Harvard University Press
ISBN #:0-674-79303-X
DATE/EDITION: 2nd printing 1997

**AUTHOR: Donald Shelton**
**TITLE: Forensic Science at Court- Challenges in the Twenty First Century**
**PUBLISHER: Rowman and Littlefield Publishers**
**ISBN #:1-4422-0188-0**
**DATE/EDITION: 2011**

**TOPICAL OUTLINE OF COURSE**

**B1- August 27: Introduction and history of Criminal Justice.**
**English Common Law – Judicial creation from Greek and Roman ideas merged with religious and tribal rules until Elizabethan times.**

**St. Petersburg: August 29- September 1**

**B2-September 2: Evolution of Common Law and the Development of Codes.**
**Development of codes and legal scholarship in Rome evolves during the middle ages and judges become the defacto makers of the law. Evolution of legislative bodies to fill in the blanks and increase control over the Judicial.**

**B3- September 4:American Law Creation.**
**Age of Enlightenment and the creation of law in America where there is continued reliance on common law and the creation of the modern model codes.**

Hamburg: September 5-8

**B4- September 10: The Actors in a Criminal Law Proceedings.**
**Elements of the crime and the role of witnesses. . The act (altus reus) and the state of mind (mens rea). The absence of defense of justification or excuse.**

**Antwerp and Le Havre: September 12-16**

**B5- September 17: The Expert Witness.**
**The eye witness and hearsay evidence. Judge's role as "gatekeeper".**

**B6- September 19: Science and the Law.**
**Two different cultures: one seeks to find truth and the other seeks justice.**

Dublin: September 20-23

**B7- September 25: The Judge and the Approval of Scientific Witnesses and Testimony (Frey**

**and Daubert rulings)**
**Napoleonic legal system, the Judge must be convinced of innocence. Jury of peers or a judge determines guilt in the American and English systems.**

**Lisbon and Cadiz: September 27- October 1**

**Casablanca: October 3-6**

**B8- October 7: The Elements of a Crime (statutory and regulatory crimes).**
**Specifics of the crime (simple – drugs), complex (conspiracy) and in between (death).**

**B9- October 9: The Adversarial System and the Defense**

**B10- October 12: Who Makes the Judgments (differing legal systems)**

**B11- October 14: Evidence Collection and Crime Scene Reconstruction (role of Physics and Engineering). Chemistry of energetic materials used for improvised explosives.**

Takoradi and Tema: October 15-18

**B12- October 21: Elements of the Crime-Drug Analysis (actus reus).**
**Analysis of bulk samples and mixtures, analysis of blood, and toxicological investigations.**

**B13- October 24: Toxicology and the State of Mind Defense (mens rea)**

**Cape Town: October 26-30**

**B14- November 1: Class Evidence- Hairs and Fibers**
**Spectroscopic and microscopic methods.**

**B15- November 3: Bombs, Arson, and the Analysis of Residues**
**Detection, analysis of bulk materials, and analysis of residues (improvised explosive devices)**

**B16- November 6: Scientific Analysis as an Investigative Tool (presumption and identification)**
**Field testing methods and screening techniques.**

**B17- November 9: Blood and Body Fluids-Introduction to DNA "Fingerprinting"**
**DNA evidence has been an evolving system started with body fluids and evolved after the Human Genome Project.**

**B18- November 11: DNA Amplification and the Need for Quality Assurance and Control**

Buenos Aires: November 12-16

**B19- November 18: DNA Methods (Mitochondrial and Y-chromosome).**
**Mitochondrial DNA sequencing methods compared to analysis of short tandem repeats in DNA.**

**Rio de Janeiro: November 20-22**

**B20- November 24: DNA Methods (Statistics)**
**Quality control and quality assurance as part of validation and accreditation.**

**B21- November 26: Daubert Rules of Evidence and the Status of DNA Examinations and the Use of Databases to Identify Criminals**

**B22- November 29: Mock Daubert Hearings**

**Manaus: December 2-5**

**B23- December 7: The Future of Scientific Investigations to Reduce Terrorism and Convict Criminals**

**A. DNA data base of convicted felons – could everyone be put into the database?**
**B. Analysis of DNA at the crime scene (chemistry on a chip)?**

**B24- December 9: Review**

**B25- December 13: A Day Finals**

**FIELD WORK**

Field lab attendance is mandatory for all students enrolled in this course. Please do not book individual travel plans or a Semester at Sea sponsored trip on the day of our field lab.

> ***FIELD LAB*** (*At least 20 percent of the contact hours for each course, to be led by the instructor.*)
>
> Title: Functions and roles of the Forensic Laboratory
>
> Port and date: Buenos Aires November 12
>
> Destination: State Crime Lab
>
> Duration: 8 hours
>
> ***FIELD ASSIGNMENTS***

***Academic objectives: The students will be divided into teams and each team will focus attention on a specific type of instrumentation in the laboratory. They will prepare a report and presentation for the class based upon their questioning of the scientists in the lab. They will also focus on this technique and type of evidence later in the semester when they make the arguments for inclusion of this technique and application in a mock Daubert Hearing. Each individual will write a report on the collection, preservation, and analysis of a particular type of evidence (which will include a description of the overall quality assurance and quality control measures required). Each student will also be responsible for identifying difference in the administration of the criminal justice systems for several of the ports with emphasis on how the systems have evolved.***

**METHODS OF EVALUATION / GRADING RUBRIC**

Students will work in teams and will be expected to keep all team members contributing to their group efforts. The teams will define and present an outline of how to manage a particular type of evidence from collection to testimony. They will also present a lecture on a particular analytical technique used in the crime laboratory and one on instruments or techniques that can be used at the crime scene. The group will also participate in a mock Daubert hearing about the techniques they are discussing. In addition to the grades for their team activities they will be given individual exams based on the material covered in class or with online video presentations.

Group projects will count for 50% of the grade while the other 50% will depend on examinations (30%), individual assigned assignments including comparisons of the justice system for 4 of the countries visited (10%), and class attendance (10%).

.**RESERVE LIBRARY LIST**

AUTHOR: John M. Butler
TITLE: Fundamentals of DNA Typing (paperback)
PUBLISHER: Academic Press

ISBN #:0123749999
DATE/EDITION: 2009 1st edition

**ELECTRONIC COURSE MATERIALS**

**HONOR CODE**
Semester at Sea students enroll in an academic program administered by the University of Virginia, and thus bind them to the University's honor code. The code prohibits all acts of lying, cheating, and stealing. Please consult the Voyager's Handbook for further explanation of what constitutes an honor offense.

Each written assignment for this course must be pledged by the student as follows: "On my honor as a student, I pledge that I have neither given nor received aid on this assignment." The pledge must be signed, or, in the case of an electronic file, signed "[signed]."