

## FORENSIC BIOLOGY, EMERGENCY MEDICINE AND DEATH INVESTIGATION

FRSC 440 - 101

Tuesdays 6:00 – 8:50 PM

Cynthia Zeller, Ph.D.

**Course Description:** Instruction and laboratory practice in identifying biological evidence using various biochemical, instrumental, microscopic and electrophoretic methods to determine their possible origin and species. Methods used in the determination of Cause and Manner and Time of Death as well as trauma patterns associated with various weapons will be discussed and examined. The role of SANE nurses in sexual assaults will be discussed. Three hours of lecture/laboratory per week.

**Objective:** Students will gain valuable hands-on lab experience including notetaking, making solutions and testing serology reagents on body fluids using Universal Precautions. Microscopic examination of sperm and hair will be conducted in the laboratory. Forensic death investigation will be discussed and presented via virtual autopsy. Evidence recovery from victims of sexual assault during hospital examination will be discussed.

**Required Text-** Essential Forensic Biology, 3rd ed., Gunn, Alan. Wiley, Chichester, UK, 2019. ISBN-13: 978-1119141402

**Recommended reference text:** Forensic Pathology 2<sup>nd</sup> Edition, DiMaio, DiMaio, CRC Press 2001 (see blackboard)

**Required materials:** safety glasses or goggles, lab coat, lab notebook (any type), blue or black pen

### **Assessment (1000 points):**

Lab notebook	50 points
Quizzes- (6 at 50 points each)	300 points
Midterm	250 points
Final Exam	250 points
Research Paper	100 points
Presentation	50 points

### **Grade assignment:**

A = above 92.9 %, A- = 90 – 92.9 %,

B+= 87-89.9 %, B = 83.0-86.9 %, B- = 80-82.9%

C+ = 75-79.9, C = 70-74.9 %,

D+ = 65-69.9 %, D = 60-64.9%

F=0-59.9%

**IMPORTANT:** Students who fail to appear for the first session of evening classes, may forfeit their space in class. Instructors have the right to release these spaces to other students wishing to add the class to their schedules. Students who lose their spaces must officially withdraw from the course through Enrollment Services to avoid earning an FX grade for non-attendance.

## Tentative Course Schedule

Date	Topic	Book Chpt	Action Items
8/31/21	Introduction to course, Syllabus, Chemistry safety, Biosafety, Bloodborne Pathogens, Universal Precautions, Personal Protective Equipment, Quality Assurance, Biological Evidence Concepts and sources of body fluids, Types of cases, Evidence collection, Chain of Custody, Evidence storage and contamination, Evidence sampling		Obtain lab notebook, eye protection, lab coat
9/7/21	Role of the Sexual Assault Nurse Examiner (SANE), Introduction to Serology, Antibody-antigen reactions, ELISA, Quality control, Notetaking		
9/14/21	Introduction to Microscopy, Hair and Fibers laboratory. Hair Evidence Concepts and limitations, Testing: Morphology, Microscopy, Human vs. Animal, Quality control.		Notebook check RESEARCH PAPER TOPIC DUE
9/21/21	Semen Evidence Concepts and Testing: Components (including sperm), Chemical Tests and Reactions, Lab Testing methods and reagent preparation, Quality control		Notebook check Microscopy Quiz
9/28/21	Blood and Saliva Evidence Concepts and Testing: Components, Chemical Tests and Reactions, Lab Testing methods and reagent preparation, Quality control.		Notebook check Semen Analysis Quiz
10/5/21	Urine and other body fluids Evidence Concepts and Testing: Components, Chemical Tests and Reactions, Lab Testing methods and reagent preparation, Quality control		on-line module with quiz- class will not meet in person
10/12/21	Introduction to DNA analysis of body fluids, Testing: PCR/STR, Mitochondrial DNA		Notebook check Blood and saliva analysis quiz
10/19/21	<b>MIDTERM EXAM</b>		
10/26/21	Definition of Death, Suicide and Homicide, Cause and Manner of Death, Time of Death determination, Forensic Entomology		Notebook check
11/2/21	Forensic Anthropology and Odontology with lab		Notebook check
11/9/21	Blunt and Sharp Force Injuries, trauma patterns, Gunshot and Shotgun Wounds, Asphyxia and Drowning. Accidental vs Homicide		Notebook check Forensic Anthropology quiz
11/16/21	Forensic botany		Notebook check
11/23/21	Virtual Autopsy		Notebook check
11/30/21	Courtroom testimony		Pathology quiz
12/7/21	<b>PRESENTATIONS</b>		Notebook check Paper due
12/14/21	<b>READING DAY</b>		<b>STUDY</b>
12/21/21	<b>FINAL EXAM at 7:30 pm</b>		

## **Assessments:**

### **Notebook Checks (total 50 points)**

Students will be expected to take notes in their laboratory notebooks outlining the procedures performed or observed, results obtained and conclusions justified by the results. These notes should be taken in blue or black ink, in a bound notebook. 5 points possible per check.

### **Quizzes (50 points each, 300 points total)**

Quizzes will be on topics listed, but may include review questions at the discretion of the instructor. Quizzes will be given in class without notes, except for 10/5/21.

### **Research Paper (100 points)**

Students will write a 10 page, double spaced, one inch margins, research paper about a recent case. This paper should focus on the forensic laboratory techniques and/or pathology that were used to solve the case. The rubric for the paper will be uploaded on BlackBoard. The topic for this paper is due on 9/14/21.

### **Presentation (50 points)**

Each student will give a 10-15 minute PowerPoint presentation on a crime of their choosing with a focus on the techniques and investigators used to solve the crime. It is expected that the topic for the paper and the presentation will be the same. The rubric for this presentation will be posted.

### **Chemistry Department Statement on Classroom Diversity and Inclusion:**

The students, faculty, and staff at Towson University represent a diverse and vibrant community of learners and scholars. As a community, we value the unique contributions of each individual and promote active participation in all aspects of the learning process by each community member. Your instructor supports Towson University's goal of fostering a diverse and inclusive educational setting. Your instructor strives to create a classroom environment built upon the principles of mutual respect and support. Toward this end, all members participating in this course are expected to demonstrate respect for all other members of the class. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison, Dr. Cindy Zeller (czeller@towson.edu). For further information regarding the diversity and inclusion policies of Towson University, please see Towson University's "Strategy 1: Exposure to Diversity", the Fisher College of Science and Mathematics Diversity Action Plan, and the Chemistry Department Diversity Action Plan.

**Students with Disabilities:** This course is in compliance with Towson University policies for students with disabilities. Students with disabilities are encouraged to register with Disability Support Services (DSS), 7720 York Road, Suite 232, 410-704-2638 (Voice) or 410-704-4423 (TDD). Students who expect that they have a disability but do not have documentation are encouraged to contact DSS for advice on how to obtain appropriate evaluation. A memo from DSS authorizing your accommodation is needed before any accommodation can be made.

**Laboratory Policy for Pregnant Students:** Pregnant students should consult their physicians for advice on whether or not to perform experiments in the laboratory. Students are encouraged to provide their physician with a list of the chemicals that they might be exposed to while in lab. They should also check the SDS sheets (available in the Department) to be aware of the hazards of the chemicals. If a student is advised against performing laboratory work, then faculty must make accommodations for the student. Any accommodations should comprise a workload that is approximately equivalent to the regularly

scheduled laboratory work. These accommodations may include: - performing “dry” experiments only, in a place free from exposure to ongoing experiments; - performing the wet chemistry at a later date; - receiving an incomplete grade in the course pending completion of experimental work Course repeat policy: “Students may not repeat a course more than once without prior permission of the Academic Standards Committee.”

**Student Academic Integrity Policy (TU 03.01.00):** The Towson University Code of Conduct prohibits "all forms of dishonesty including cheating (and) plagiarism." Please refer to TU 03.01.00 regarding student academic integrity. If you have any questions concerning the document feel free to contact the course instructor, the Forensic Chemistry Program Director or [Academic Affairs Policies | Towson University](#) at Towson University › about › administration › policies › academicaffairs.