



IT IS THE RESPONSIBILITY OF EACH STUDENT TO READ THIS SYLLABUS IN ITS ENTIRETY BEFORE THE FIRST LECTURE! THIS SYLLABUS AND ITS CONTENTS ARE SUBJECT TO CHANGE. STUDENTS WILL BE NOTIFIED OF THESE CHANGES.

Lecture:

Both sections: T/R– 8:00 – 8:50 AM **Location:** 213 Buckhout Lab

Laboratory:

Section I: T/R – 9:05 AM – 12:05 PM **Location:** 168 North Frear

Section II: T/R – 2:30 PM – 5:30 PM **Location:** 168 North Frear

Faculty: Reena Roy, Ph.D. Associate Professor

Email: rxr34@psu.edu

Office phone: 814-867-2054

Office: 325B Whitmore Laboratory

Office hours: No regular office hours, by appointment only

Laboratory: 814-865-3303

**Use Outlook, not Canvas, to
contact the instructor/CAs**

Course Assistant: Mollie Comella, Chloe Purick, undergraduate students

Email: msc5504@psu.edu, cmp6098@psu.edu

Office hours: Mondays 5:30-6:30 PM, second set TBD in Frear fishbowl/168 North Frear or by appointment

Emails of a **personal nature** (missing class due to illness, emergencies, family issues etc.) **MUST** be sent to **Dr. Roy**. If the response to an email regarding **class material** is beneficial to the class, a response may be sent out to all the students or an announcement made in class, without mentioning the sender's name.

The office hours are a time for students to ask questions regarding their reports, quizzes, or pop quizzes. You may also bring reports to office hours before they are due with specific questions. The instructor or the CAs will **not** proofread your entire report for you. Questions regarding the lecture material should be addressed in person with Dr. Roy.

Recommended Texts:

Saferstein, R., ed. Forensic Science Handbook: Volume I, & II, Upper Saddle River: Prentice-Hall, 2002, and 2005

Robert R. Ogle, Jr. and Michelle Fox; Atlas of Human Hair: CRC Press, 1998

Other Resources:

A list of references (PSU 007) will be posted on Canvas. Students should use these for any additional material they need in order to study. Additional PSU protocols with relevant references will be provided throughout the course via Canvas.

Requirements Prior to Attending the First Lecture:

FRNSC major, FRNSC 210, BIOL 230W or MICRB 202 or BMB 251 or BIOL 240W, and a basic foundation in chemistry, biology, and mathematics

COURSE SCHEDULE

This schedule is subject to change. Students will be notified if any changes are made.

Purple text indicates protocol numbers that should be read prior to that week's lab sessions. Students will be chosen at random during the semester to summarize lab protocols at the beginning of lab. This is part of your lab safety, preparedness and maintenance score, so be sure to read all relevant documents. Protocols PSU 001-008 should be referred to throughout the duration of the semester. Check your Canvas messages frequently, as alterations to the course schedule and report due dates will often be announced.

WEEK OF AUG 26: Introduction of Laboratory Practices and Hair – Screening of Evidence, Hair Analysis

SOP Training, evidence handling, human hair versus animal hair by microscopic analysis, different aspects of human hair analysis

Bring a lock with you to lab, beginning with the first lab session

Quality Assurance and Quality Control (QA and QC)

DNA audit documents, brief introduction to ISO 17025 and ANAB standards, homework assignment

WEEK OF SEP 02: Screening of Evidence and Trace (Hair) Evidence Analysis

Report writing on hair (PSU 009)

WEEK OF SEP 09: Body Fluid Identification: Examination of Blood

Blood and its significance, identification of human and animal blood, presumptive tests (PSU 010-015), report writing on hair

WEEK OF SEP 16: Body Fluid Identification: Examination of Blood

Identification of human and animal blood, presumptive tests, determination of species, report writing on blood

WEEK OF SEP 23: Body Fluid Identification: Examination of Spermatozoa

Identification of various species of spermatozoa and review of hair slides, report writing on blood

Dr. Jason Brooks, Lecture 24SEP2019, Veterinary Forensics

REVIEW SESSION DURING LAB PERIODS (TU 24SEP2019)

QUIZ I: EVIDENCE, BLOOD & HAIR ANALYSIS (THUR 26SEP2019)

Body Fluid Identification: Sexual Assault Evidence Analysis

Presumptive and confirmatory tests for semen (PSU 016-018), examination of sexual assault kit

[Punch; DNA profile using Fusion 6C \(PSU 021\)](#)

WEEK OF SEP 30: **Body Fluid Identification: Sexual Assault Evidence Analysis**
presumptive and confirmatory tests for semen (PSU 017-018), examination of sexual assault kit, report writing on semen, SANE/SART

Examination of Saliva and Urine; presumptive and confirmatory tests
Presumptive tests for saliva (PSU 022-024), identification of saliva in a mixture

Identification of urine using presumptive tests (PSU 025-026), report writing on mixture analysis

WEEK OF OCT 7: **Examination of Saliva and Urine;** presumptive and confirmatory tests
Presumptive tests for saliva (PSU 022-024), identification of saliva in a mixture
Identification of urine using presumptive tests (PSU 025-026), report writing on mixture analysis

WEEK OF OCT 14: **Introduction to Forensic Molecular Biology**
Basic concepts, extraction of DNA from body fluids using various extraction methods, quantification of DNA, amplification of DNA (PSU 019-021)

REVIEW SESSION DURING LAB PERIODS (TUE 15OCT2019)

QUIZ II: SEXUAL ASSAULT ANALYSIS (THU 17OCT2019)

PRACTICAL EXAM I (15OCT2019 & THUR 17OCT2019): HAIR, BLOOD & SEMEN

WEEK OF OCT 21: **Forensic Molecular Biology and DNA Analysis**
Capillary Electrophoresis, DNA data analysis

WEEK OF OCT 28: **Law and Court Testimony; Beatrice Six, Ethics and Biology**

WEEK OF NOV 04: **Arthur Young Expert Witness Testimony**
Introduction to Saliva and Urine Analysis

WEEK OF NOV 11: **Introduction to Saliva and Urine Analysis**
Identification of urine using presumptive, and semi-confirmatory tests, report writing on saliva and urine

**REVIEW SESSION DURING LAB PERIODS (TUE 12NOV2019)
QUIZ III: FORENSIC MOLECULAR BIOLOGY, LAW (THU 14NOV2019)**

LATE DROP DEADLINE IS 15NOV2019

WEEK OF NOV 18: **Presentation by students; DNA audit documents**

WEEK OF NOV 25: **Thanksgiving Break (NO CLASSES)**

WEEK OF DEC 2: **Depositions**

**PRACTICAL EXAM II (TUE 03DEC2019 & THUR 05DEC2019): BLOOD,
SALIVA, URINE, & SEMEN**

WEEK OF DEC 09: **REVIEW SESSION DURING LAB PERIODS (TUE 10DEC2019)
QUIZ IV: URINE, SALIVA (THU 12DEC2019)**

**(NOTE: Quiz IV WILL involve crime scene scenarios that involve all
body fluids included in this course and also will include the learning
experience of the entire course.)**

LABORATORY SAFETY

Summary of Appropriate PPE for Laboratory Sessions:

1. Sleeveless and tops with holes, low-cut or baggy clothing, flip-flops and open-toed shoes are not permitted
2. Long pants, free of holes/rips, must be worn at all times
3. Gloves and a lab coat must be worn when handling body fluids or chemicals
4. Safety glasses must be worn when using chemicals or a hot plate
5. Long hair must be tied back in a bun before entering the room
6. No hats or headphones allowed during the lab period

One of the goals of the laboratory portion of this class is to complete all of the sessions with no injuries or accidents. Safety is our primary concern. **Attitude** and **knowledge** are the two components necessary to ensure safe lab practices are implemented. Adopting a **safe attitude**, in addition to being **cautious** and **careful** will do a great deal to avoid accidents and injuries. Avoid being sloppy and reckless. **Know** what potential hazards are before a laboratory session to avoid accidents and injuries.

Each time you enter 168 N. Frear the laboratory where you will perform all of your analysis, adopt a “**safety first**” **attitude**. Training will be provided prior to starting the laboratory sessions. In addition, the following are safety procedures which we will follow during all laboratory sessions.

You must follow the below instructions:



- 1. Wear the appropriate personal protection equipment and apparel at all times.**
 - a. Safety glasses must be worn when utilizing chemicals or hot plates.
 - b. Appropriate clothing must be worn to ensure the safety of all individuals in the lab. If students are wearing inappropriate lab attire when they enter the lab, they may be dismissed from the lab or receive a penalty at the discretion of the instructor.
 - i. Sleeveless tops and shirts that expose the chest/upper arm or belly/midriff are not allowed. Tops must fully cover the upper torso (neck to below navel) and a portion of the arms.
 - ii. Shorts, capri leggings, capris, skirts, and dresses are not permitted. Pants must reach the ankle and be free of holes and rips.
 - iii. Open-toed shoes, including sandals and flip-flops, and high heels or other unstable footwear may not be worn in lab. Close-toed shoes must be worn.
 - iv. Loose/baggy, revealing, or potentially offensive attire is prohibited.
 - v. Jewelry, neckties, and long hair may pose safety hazards. Secure these before entering the lab.
 - c. Safety and cleanliness issues will incur penalties at the discretion of the instructor.
- 2. Know the exact location and proper operation of safety equipment. Instructor will show you these.**
 - a. Eyewash fountain
 - b. Fire extinguisher
 - c. Fire blanket
 - d. First aid kit
 - e. Emergency exit route
- 3. NEVER work alone in the laboratory.**
- 4. Perform only the assigned laboratory protocol as directed by your instructor.**
- 5. NEVER eat, drink or chew gum etc. in the laboratory. Food and drinks must be left outside the lab in the provided lockers.**
- 6. Handle chemicals with care.**
 - a. Do not use bare hands to pick up any chemicals or touch any object that may contain biological material.
 - b. Always wear gloves when doing any analysis, including examination of evidence.
 - c. Do not put pencils, pens, or fingers in your mouth.
 - d. Read labels to make sure you have the desired chemical.
 - e. Keep lids on bottles except when removing chemicals.
 - f. Handle bottles by the base, not the lid, to avoid spills.
 - g. Never touch, taste or inhale a chemical.
 - h. Never mouth pipette.
 - i. Wipe up spills immediately following the prescribed clean up procedure.

- j. Wash hands thoroughly before leaving the laboratory anytime you know you may have come in contact with biological fluid or chemicals. Please use the appropriate bathroom with a soap dispenser located in the vicinity for your convenience.

7. Immediately report all accidents, spills, cuts, or other incidents to the instructor, no matter how minor.

8. A clean laboratory is a SAFE Laboratory.

- a. Put all personal items in the provided locker except the lab notebook, pen and the assigned protocols. NO books, laptops, purses, coats, at the laboratory benches will be allowed. The binder should be put under the tables.
- b. Clean and put away all apparatus and equipment before leaving the laboratory. **Note in the grading scheme that protocols in binders, lab maintenance, safety, and preparedness is 4% of your class grade.** This includes but is not limited to the above listed guidelines; items such as turning off power strips before leaving, securing evidence in the evidence locker at the end of your lab session, proper use of microscopes, and arriving to lab with relevant protocols printed and read. Failure to follow these guidelines will result in deductions to your grade.
- c. Wipe up any water or other spills immediately to avoid slippery conditions.

9. THINK at all times.

- a. Know what you will do before coming to the laboratory.
- b. *Read the protocols thoroughly, be familiar with the safety issues that may arise during the laboratory session.*
- c. Identify potential hazards before each laboratory module.
- d. Check glassware and equipment before use. Avoid using broken items.
- e. Avoid touching hot objects.
- f. Be aware of what other students are doing.

GRADING

Reports and Accompanying Documentation	195 points	19.5%
Practical Exam I	125 points	12.5%
Practical Exam II	125 points	12.5%
Quiz I	100 points	10%
Quiz II	125 points	12.5%
Quiz III	125 points	12.5%
Quiz IV	75 points	7.5%
QA/QC Activity and Presentation	40 points	4%
Deposition	60 points	6%
Lab safety, preparedness (protocols printed and read), microscope	30 points	3%
Total	1000 points	100%

Grading Scale

The grading scale follows the university guidelines. It is final and will not be altered under any circumstances. This scale will be used when

Percent	Letter Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
70-76	C
61-69	D
≤ 60	F

How can you earn bonus points?

1. Perfect attendance (coming **on time** to lab and lecture every day), all protocols in binder
2. Pop quizzes given during the laboratory period
3. Additional report (impromptu)

All bonus point values will be determined by the instructor at the end of the semester

grading quizzes and practical, and when assigning final course grades. Individual assignment grades will be released on Canvas after they have been given to students during the lab period. A summary of each students' points earned will be given to students mid-way through the semester.

There is no curve in this class, and the percentage cutoffs will not be altered. However, there are bonus points that can be earned throughout the semester. Points and grades are subject to Dr. Roy's discretion.

Bonus Points

There are many bonus point opportunities made available to all students. Pop quizzes will be given during some lab

periods, and at the end of the semester, the instructor will determine what percentage of these bonus points will be added to each students' final score. The same percentage will be applied to each student. Any information learned in class, from the syllabus, tips document, emails from the CAs/instructor, and protocols may be included in the pop quizzes. More information regarding the additional report will be given in class. The total maximum bonus points will be between 1 and 10%, as decided by the instructor. Study every day to increase your chances of earning bonus points.

Report Writing

Over the course of the semester, each student will write a total of six reports, one mandatory amended report (points for extra credit), and one optional additional report for extra credit. These will be written following documentation and analysis of evidence in the laboratory. Instruction will be given during the lab period, and example reports, grading rubric, and tips document will be uploaded in Canvas.

A total of 230 points are available in the "Reports and Accompanying Documentation" category; however, the lowest report grade is dropped, so the maximum points you can earn for report-writing is 195. The Mixture Analysis Report will **not** be dropped.

Report Title	Points
1. Hair Analysis Report	35
2. Sexual Assault Kit Inventory and Hair Analysis Report	35
3. Blood Analysis Report	35
4. Sexual Assault Analysis Report	35
5. DNA Extraction and Analysis Report	35

Reports are due at the beginning of the laboratory period as instructed by the course assistants and Dr. Roy. Every report must be printed, stapled, signed, and dated, *before entering* 168 North Frear. No stapling or printing will be allowed in the lab. All documentation must be attached to the typed report. Emailed reports will not be accepted. Reports must be your own work; proofreading by peers is allowed and encouraged, but penalties will be incurred if students are found to be collaborating during the report-writing process. Be sure to read PSU 008 and all other relevant documents on Canvas to avoid losing points. The course assistants will answer questions regarding reports in lab or during office hours.

6. Mixture Analysis Report	55
Total	230

Practical Examinations

Two practical examinations will be given during the course. These two-day examinations are an assessment of the evidence examining skills a student has learned in lab. The first day consists of conducting tests on item(s) of evidence, identical to the types of analysis conducted during the lab in the weeks leading up to the practical. A report, similar to the typed reports submitted throughout the semester, will be written on the second day, or the first day if the student chooses.

Practical Exam I Grading Scheme

Practical Exam I Grading Scheme		
Evidence Submission		
Initial and Date on Envelope	4	12%
Tape Seal on Envelope/Evidence	3	
Case #/Item # on Envelope/Evidence	4	
Received/Opened on Envelope	4	
Total	15	
Evidence (Doing Tests)		
Blood	8	12.8%
Semen	8	
Total	16	
Correct Identification of Evidence		
Blood	10	23.2%
Semen	10	
Hair Identification Given as Evidence	9	
Total	29	
Report Writing		
Report	35	28%
Microscopic Identification		
Correct Identification	30	24%
Total	125	100%

Practical Exam II Grading Scheme

Practical Exam II Grading Scheme		
Evidence Submission		
Initial and Date on Envelope	4	12%
Tape Seal on Envelope/Evidence	3	
Case #/Item # on Envelope/Evidence	4	
Received/Opened on Envelope	4	
Total	15	
Evidence (Doing Tests)		
Blood	10	24%
Semen	10	
Saliva	5	
Urine	5	
Total	30	
Correct Identification of Evidence		
Blood	10	36%
Semen	15	
Saliva	12.5	
Urine	7.5	
Total	45	
Report Writing		
Report	35	28%
Total	125	100%

LEARNING OBJECTIVES

Objective	Strategies and Assessments
By successfully completing FRNSC 413, students will:	These goals will be accomplished by:
1. Demonstrate proficiency in laboratory skills necessary for a career in criminalistics or evidence examination and analysis	Conducting various biological experiments on simulated items of evidence commonly encountered in forensic crime scenes; performing practical examinations
2. Demonstrate the ability to analyze and interpret scientific data	Documenting the evidence examination process; writing typed reports summarizing their findings; taking written examinations
3. Develop oral and written communication skills for presentation of their findings in accordance with established professional guidelines	Documenting the evidence examination process; writing typed reports summarizing their findings; taking written examinations; participating in a deposition (optional)
4. Develop the ability to provide proper scientific expert witness courtroom testimony	Instruction in fundamental scientific principles behind examinations of biological evidence; instruction in courtroom testimony; taking written examinations
5. Develop an understanding of the importance of accreditation and certification in the scientific community	Presenting on quality assurance/quality control (optional)
6. Demonstrate knowledge of current policy, legal, and ethical guidelines for professional scientific practice	Instruction in incorporating ethical and legal requirements into laboratory analysis and report-writing

OTHER POLICIES

Attendance Policy: Students are expected to attend every lecture and laboratory session (refer to University Faculty Senate *Policy 42-27: Class Attendance* for further information). Recurrent attendance issues may result in deductions from the final course score.

If missing a quiz becomes a necessity due to an **excused** absence, the student must contact Dr. Roy to make other

Deductions from *Final Grade* for Unexcused Absences from Lab and/or Lecture

Late arrival in lecture/lab: Two days---5% deduction

Late arrival in lecture/lab: Three or more days---10% deduction

Late is defined as arriving 5 minutes or more after the start of lecture/lab

Two unexcused absences 10% deduction

Three unexcused absences 25% deduction

Four unexcused absences 40% deduction

arrangements. If missing a laboratory session becomes a necessity due to an **excused** absence, the student must contact Dr. Roy to attend another section. Acceptable excuses and attendance scores are subject to Dr. Roy's discretion.

Attendance will be monitored. Each student is permitted to be marked absent for one lecture without incurring penalties. Beyond one absence, a deduction from the final course score will result unless proper documentation is provided. In order to receive bonus points for perfect attendance, a student must attend every lecture and lab on time. **Additionally, students are not permitted to stay past the scheduled lab time and must exit the lab accordingly.**

If a student misses a lecture, they are to contact Dr. Roy directly. *Excuses for being late or missing classes that are communicated through a classmate are not acceptable.* Students who miss lecture are responsible for picking up any handout associated with that lecture. No lecture notes will be posted on Canvas for any reason.

Submitting a report later than instructed, unless there is a reasonable excuse such as a medical emergency, will result in a lower grade. 10% will be deducted for each day the report is late, up to 30%. Unless there is medical or other emergency situation, report will not be accepted after three days.

There are no scheduled make-up labs. *The only way a student may make up a lab is by coming to another lab section.* With each unexcused absence beyond the first, a student will lose all points associated with that particular lab and relevant assignments.

No bathroom breaks are allowed during examinations except during practical exams. When possible, there must be at least one seat between each student during written examinations. No material should be on the desk while taking a written examination except writing materials. Students may use pen or pencil for written examinations; all documentation, including practical exams and practical exam reports, must be written in pen. Students are permitted to sketch with pencil.

Students may be marked absent for any of the following reasons:

1. Being absent from class without an excuse cleared by Dr. Roy and NOT notifying Dr. Roy directly
2. Using a cell phone, laptop, tablet, etc. during lecture or lab without permission from Dr. Roy
3. Arriving more than 10 minutes late to lecture or lab

Academic Integrity

All Penn State policies regarding ethics and honorable behavior apply to this course. Academic dishonesty is not limited to simply cheating on an exam or assignment.

Academic integrity is an essential component of your education. It is your responsibility to be familiar with the policies set forth by the University Faculty Senate (Policy 49-20: Academic Integrity) and by the Eberly College of Science. The following is quoted from the "PSU Faculty Senate Policies for Students." "It is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students." All University and Eberly College of Science policies regarding academic integrity/academic dishonesty apply to this course and the students enrolled in this course. Refer to

the following URLs for further details on the academic integrity policies of the Eberly College of Science:

<http://www.science.psu.edu/academic/Integrity/index.html> and <http://www.psu.edu/ufs/policies/>

Matters of academic dishonesty will be turned over to the University disciplinary system and may result in the failing of the course.

The Eberly College of Science Code of Mutual Respect and Cooperation (www.science.psu.edu/climate/Code-of-Mutual-Respect-final.pdf) embodies the values that we hope our faculty, staff, and students possess and will endorse to make The Eberly College of Science a place where every individual feels respected and valued, as well as challenged and rewarded.

The Eberly College of Science is committed to the academic success of students enrolled in the College's courses and undergraduate programs. When in need of help, students can utilize various College- and University-wide resources for learning assistance.

<http://www.science.psu.edu/advising/success>.

Disability Services

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at <http://equity.psu.edu/ods/>.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at

<http://equity.psu.edu/ods/guidelines/documentation-guidelines>).

If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with the instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.

Other important items to note:

1. Spelling counts for every word you write on every graded assignment, including quizzes, practical exams, lab reports, and pop quizzes. Deductions will be made for misspellings.
2. Laboratory maintenance, safety, and preparedness includes coming to lab prepared (protocols printed, reports stapled, signed, and dated with pages numbered prior to entering the laboratory), cleaning up your lab space at the end of the period (cleaning and returning tools to their proper place, placing evidence in the indicated location, turning off the power strip if you are the last person to leave your lab bench), and wearing the appropriate lab attire (Laboratory Safety). Points in this category are not gained, but deducted each time the above expectations are not met.
3. If you have questions or need clarification on any assignment or procedure, ask the instructor or course assistants. They are here to help you learn!