# Loyola University Maryland

**INTRODUCTION TO FORENSIC SCIENCE WITH LAB (BL 101-01/-02)**

**Fall 2022**

**Tuesday / Thursday 1:40-3:40pm and 4:00-6:00pm Donnelly Science Building, Room 244**

**Instructor:** Alan Thoms-Chesley, Ph.D.

**Office:** DS 259

**Email:** [**athomschesley@loyola.edu**](mailto:athomschesley@loyola.edu)

**Phone:** 410 617-5504 x5504

**Office Hours:** Tuesday 12:30-1:30pm, 6:00-7:00pm, Thursday 10:30am-1:00pm, Friday 10:00-11:00am, Zoom by appointment

**Required Text and Readings**

1. **Saferstein, Richard, Roy, Tiffany (2021) *Criminalistics: An Introduction to Forensic Science.* 13th Ed. New York: Pearson.**
2. Additional readings and case studies on selected topics will be provided in class.

**Required Materials**

Lab coat, ruler, pencils, graph paper (1/4 inch squares), computer

**Course Description**

**BL101 is a Diversity-Justice Designated course with a heavy emphasis on justice and how forensic science has intersected with the American justice system throughout history. Through a justice-focused lens, forensic science is critically examined for its successes in criminal investigations but also for its failures resulting in the wrongful convictions and incarcerations of individuals primarily from marginalized groups in the United States.**

**As a Diversity-Justice course, BL101 is designed as a broad survey of forensic science and how it has evolved over time. Topics include crime scene investigation and reconstruction, eyewitness testimony, death investigation, trace evidence analysis (fiber), impression evidence analysis (handwriting and fingerprinting), forensic serology and DNA fingerprinting and serial killer profiling**.

A major theme that runs through this course is how forensic science has only just recently been put in the spotlight for its use of invalid scientific methods and techniques that have led to false convictions, false incarcerations, and the fracturing of families and communities composed primarily of marginalized people.

In addition to classroom discussions and group work, you will gain hands on experience with several lab techniques that have been or are currently utilized by forensic investigators. Lab exercises include fiber analysis, document forgery, fingerprint characterization, blood identification, typing, and pattern analysis, and forensic DNA fingerprinting. These

techniques will be discussed in terms of their scientific validity, usefulness in forensic investigations, and error rates. The advent of forensic DNA fingerprinting technology will be discussed as a valid forensic technique and as a means of addressing wrongful convictions stemming from racist practices involving incorrect eyewitness testimony, bias in interpretation and testimony about physical evidence, and misapplied forensic techniques.

Overall assessment of your understanding of the concepts presented in class and your acquisition of skills will be through written work, one mid-term exam, a formal lab report, a final exam, and active participation in class.

**Learning Aims (Diversity-Justice learning aims)**

At the completion of the course, the student will be able to:

1. Explain how forensic science has been justly applied to solve important cases and unjustly applied in others leading to wrongful convictions of marginalized individuals in the United States.
2. Describe and explain forensic science, including its history, its grounding in racist practices, and its use in criminal investigations today.
3. Understand the role of the forensic scientist in the criminal justice system and the role that bias plays in faulty forensic science and its impact on wrongful convictions of marginalized individuals.
4. Develop and use independent critical thinking skills, particularly in a contextual situation to understand how unjust application of forensic science has led to faulty convictions and incarcerations.
5. Develop and improve science skills including observation, data analysis, data interpretation, communication (writing and speaking) and realize that seeking truth and justice through science is a difficult process, subject to error and can be tainted by bias including personal and systemic racism.
6. Work cooperatively in small and large groups to complete projects, actively engage in listening and discussion, and reflect about issues of justice and racism because of faulty forensic science.

**Expectations**

Please complete the assigned readings before class so that we may have productive discussions. In addition, your presence and participation in class is important for your success and the overall success of this course.

**Academic Integrity**

## Loyola University Maryland Honor Code Statement:

“The Honor Code states that all students of the Loyola Community have been equally entrusted by their peers to conduct themselves honestly on all academic assignments.

The students of this College understand that having collective and individual responsibility for the ethical welfare of their peers exemplifies a commitment to the community. Students who submit materials that are the products of their own minds demonstrate respect for themselves and the community in which they study. All outside resources or information should be clearly acknowledged. If there is any doubt or question regarding the use and documentation of outside sources for academic assignments, your instructor should be consulted. Any violations of the Honor Code will be handled by the Honor Council.”

## Biology Department Honor Code Policy:

Any violation of the Honor Code will minimally result in receiving zero points on the assignment involved and may even result in failure of the course. The severity of the punishment will be based on the nature of the Honor Code violation, type of assignment, level of course, and whether the act is deemed deliberate or accidental as determined by the instructor. Failure to understand the Honor Code or various forms of cheating or plagiarism is not acceptable as an excuse for violating Loyola’s Honor Code. All violations of the Honor Code will be reported to the department chair and the Honor Council.

**Grading Information**

A variety of activities will be used to evaluate your ability to develop learning skills and demonstrate an understanding of ideas and concepts. Please let me know if you have any questions about the assignments. Missed exams or assignments without prior approval of the instructor cannot be made up and will result in a grade of ‘zero’ for the test or assignment. Similarly, lab (and class) periods should not be missed.

Each assignment is supported by a specific rubric that outlines the requirements to achieve a certain level of points. Online discussion assignments are supported by a single rubric. Exam questions (midterm and final) are weighted with point values.

Feedback will be provided on all assignments and students will have the opportunity to redo certain work **(assignments denoted by an \* in the course schedule and formal lab report only)** once they have received instructor feedback.

**Course Exams/Assignments Point Values and Weightings**

Mid-term exam 15% (100 points)

Comprehensive final exam 30% (200 points)

One formal lab report 15% (100 points)

Class work (assignments, essays, lab reports) 40% (250 points)

**Total 100% (650 points)**

Numerical grades will be provided for all exams and written work. Grade updates will be available during the course through Moodle. Mid-term and final grades will be assigned as letter grades and will comply with the grading policies outlined in the Loyola University of Maryland undergraduate catalogue.

**Grading Scale**

A = 90%, A- = 88%, B+ = 85%, B = 80%, B- = 78%, C+ = 75%, C = 70% C- = 68%,

D+ = 65%, D = 60%, F = <60%

**Redo/Extra Credit Policy**

To assist you in achieving your best possible work, **a select number of class assignments will be subject to a redo policy.** This policy only applies to assignments designated in the course/assignment schedule and only applies to assignments that have been handed in by their due date. You will have one opportunity to redo work. **The redo policy does not apply to the midterm or the final exam and does not apply to any late work submissions.** Because of this redo policy, there are no extra credit points awarded for this course.

**Student Athletes**

If you are a student athlete, please provide me with your travel and game schedule indicating when you will need to miss class to participate in athletic events. While travel for athletics is an excused absence, you will need to make up any missed work.

**Participants In Loyola-Sanctioned Intercollegiate Sports**

Practice times do NOT supersede attending lectures and labs. Inform your coaches of this at the beginning of the semester. Students will be excused for absences due to travel or competitions in intercollegiate events. Students should notify their instructors as soon as possible so that arrangements can be made to make up missed coursework.

**Attendance**

Attendance at class is both expected and required in order for you to be successful. **If you will be absent for any reason, please contact me ahead of time to inform me of the absence. In the case of any emergency, please contact me as soon as possible to let me know why you have missed class. Please have the necessary documentation to validate your absence. If you are absent for a valid reason, you will be able to complete most work posted on Moodle with the exception of labs which cannot be made up.**

**Undergraduate Add/Drop**

The Undergraduate Add/Drop period **ends Friday, September 9 at 5:00 p.m.** Students who wish to withdraw from a class after the Add/Drop period ends need to obtain an Undergraduate [Change of Registration form](http://www.loyola.edu/department/records/student-forms) available on the Records Office web site. A grade of W will be assigned during the Undergraduate Course Withdrawal period.

The Undergraduate Course Withdrawal Period **ends Monday, November 21 at 5:00 p.m.**

**The Counseling Center** supports the emotional well-being of the student body and is committed to a respectful understanding and honoring of the social, emotional, and cultural contexts represented by each individual student. The Counseling Center provides brief individual and group counseling, emergency and crisis intervention, and comprehensive referral services for those in need of longer-term therapy. We are currently providing both in -person and virtual services and this is subject to change in accordance with best health practices and state laws. Relevant updates and more information can be found on our webpage: [www.loyola.edu/counselingcenter](http://www.loyola.edu/counselingcenter) or by calling (410) 617-CARE (2273). To make an appointment, please call (410) 617-CARE (2273). For after-hours emergencies, please call our after-hours counselor at (410) 617- 5530 or Campus Police at (410)617-5911. Let’s Talk!

If you are a student registered with **Disability Support Services (DSS)** who needs accommodations for this course, please make sure you ask DSS to send a *Faculty Notification Email* (FNE) to your professor. If DSS has already sent the FNE to your professor, please schedule a brief meeting to discuss your accommodations during office hours. If you are not registered with DSS, but you have a physical or mental condition and experiencing difficulties caused by your medical condition in this or another course, please go to the [Disability Support Services' website](http://www.loyola.edu/department/dss/register) to learn more about accommodations at Loyola. Also, you can contact DSS at [DSS@loyola.edu](mailto:DSS@loyola.edu) to schedule a meeting.

**Title IX:** Loyola University Maryland is committed to a learning and working environment free from sexual and gender-based misconduct including sexual harassment, sexual assault, fondling, incest, statutory rape, domestic violence, dating violence, stalking, and sexual exploitation. Reports of such offenses are taken seriously, and Loyola encourages students experiencing sexual misconduct to report the incident in accordance with the University’s policy on [Reporting Sexual Misconduct](https://www.loyola.edu/-/media/department/title-ix/documents/student-respondent-sexual-gender-based-misconduct-policy.ashx?la=en). Because of the University’s obligation to respond to reports of sexual misconduct, mandated reporters including faculty members, are required to report incidents of sexual misconduct to the Title IX coordinator even if the reporting party requests confidentiality. Information about confidential resources that are not required to report sexual misconduct to the Title IX coordinator may be found on the [Title IX reporting](https://www.loyola.edu/department/title-ix/reporting-resources) [resources page](https://www.loyola.edu/department/title-ix/reporting-resources). For more information about policies and resources or reporting options, please review the [Title IX](https://www.loyola.edu/department/title-ix) web page. Loyola is also committed to an environment free of other forms of harassment and discrimination. For information about policies and reporting resources, please review the Bias Related Behaviors Process and Policy in the [Community Standards](https://www.loyola.edu/-/media/department/student-conduct/documents/community-standards.ashx?la=en) for policies related to students and the [harassment and](https://www.loyola.edu/-/media/department/hr/documents/about/policy-manual/harass-and-discrim-policy.ashx?la=en) [discrimination policy](https://www.loyola.edu/-/media/department/hr/documents/about/policy-manual/harass-and-discrim-policy.ashx?la=en) for policies related to employees.

**The Loyola Writing Center** is open seven days a week for both face-to-face and Zoom appointments. The complete schedule of hours is posted on the

website: <https://www.loyola.edu/department/writing-center/about/location-hours>. For questions, or help making an appointment, students can email [lwc@loyola.edu](mailto:lwc@loyola.edu).

**The Study** is located on the third floor of Jenkins Hall and serves as Loyola University Maryland’s academic support center. Our mission is to help Loyola students become successful, independent learners. We do this through a variety of free academic support services, such as peer and professional tutoring, academic success workshops, academic coaching, and time management and organization coaching. These services are available in person and online, and students can register for them through The Study’s website at [www.loyola.edu/thestudy](http://www.loyola.edu/thestudy).

**Food/Housing Insecurity and Textbook Needs:** Any student who has difficulty securing their food, housing or textbooks is urged to contact Dr. Deborah Melzer, Vice President for Student Development and Dean of Students

at [studentsuccessfund@loyola.edu](mailto:studentsuccessfund@loyola.edu). Loyola may have resources to help.

**Diversity, Equity, And Inclusion**

The community members of Loyola’s STEM departments are deeply compelled to join in solidarity with those who steadfastly oppose the evils of racism, oppression, injustice, bias, and exclusion. We stand with all members of our community, regardless of their ethnicity, gender, sexual orientation, religion, language and/or disability, and affirm their right to feel recognized, included, valued, heard, and safe in all spaces we inhabit. To this end, the policies above are meant to promote equal treatment of all students. We will also not tolerate instances of bias, discrimination, and exclusion in our classrooms, laboratories, offices, and social spaces, and will work within the University system to hold perpetrators sufficiently accountable for their actions and to fully support and restore victims. Students who feel that they have been the target of bias or who have witnessed bias related behavior may submit an incident report online (https:/[/www.loyola.](http://www.loyola.edu/department/report-bias))e[du/department/report-bias)](http://www.loyola.edu/department/report-bias)) or contact the Dean of Students’ Office. Other individuals who may be contacted include Michelle Cheatem (mlcheatem@loyola.edu), Assistant Vice President for Student Development; Christina Spearman (cjspearman1@loyola.edu), Dean of Students; or Katsura Kurita (kkurita@loyola.edu), Assistant Vice President for Student Development.

# BL101- 01: Lecture Schedule Fall 2022 (Subject to Change – Redo Policy Applies)

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| **DATE** | **TOPIC** | **Readings/Assignments** |
| Tuesday Sept. 6 | **Course Introduction**  Ice breakers  Course syllabus and philosophy | Course syllabus |
| Thursday Sept. 8 | **The “CSI Effect”**  CSI effect assignment (In class) | “CSI Effect” Videos and Readings  **CSI Effect Assignment (10)** |
| Tuesday Sept. 13 | **Crime Scene Processing**  What does a crime scene look like? What happens at a crime scene?  What happens when a crime scene is improperly processed?  (OJ Simpson case class discussion)  **Crime Scene Evidence**  Types of evidence  Locard’s Exchange Principle  Physical evidence- Roger Payne case study | **Saferstein Chapter 2 –**  The Crime Scene  Evidence Categorization Assignment **(30)** |
| Thursday Sept. 15 | **Crime Scene Sketching** Crime scene sketching basics Sketching practice activity  Sketching assignment (In class) | **Sketching Assignment (10)** |
| Tuesday Sept. 20 | **Eyewitness Testimony**  Advantages and pitfalls of eyewitness testimony  **Guest lecturer**  CPL. Vanessa De La Cruz  PG County Department of Corrections | Eyewitness testimony videos and readings  Eyewitness Testimony Assignment  **(35)**  **Evidence Categorization Assignment Due** |
| Thursday Sept. 22 | **A Case of Deductive Reasoning Quiz** | **A Case of Deductive Reasoning Activity (40)** |

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| Tuesday Sept. 27 | **Time of Death**  The first 24 hours after death, Algor Mortis activity, forensic autopsy | | | **Saferstein Chapter 5 –** Death Investigation Forensic autopsy procedure reading |
| Thursday | **Forensic Entomology** | | | **Eyewitness Testimony** |
| Sept. 29 | What is forensic entomology? | | | **Assignment Due** |
|  | Blow fly life cycle and accumulated degree | | |  |
|  | hour | | |  |
|  | **Entomology Activity** | | |  |
|  | **Sylvia Hunt Case Study** | | |  |
| Tuesday Oct. 4 |  | **Forensic Anthropology**  No Bones About It Activity |  |  |
| Thursday Oct. 6 | **Mock Crime Scene Data Collection for Midterm Exam** | | | **Midterm Exam (100)** |
| Tuesday Oct. 11 | **No class** – University Presidential Inauguration Mass | | |  |
| Thursday | **Special Topic - Arson** | | | **Midterm Exam Due** |
| Oct. 13 |  | | | **Saferstein Chapter 17-** |
|  |  | | | Forensic Aspects of Fire |
|  |  | | | and Explosion |
|  |  | | | Investigation |
|  |  | | | Flames of Justice |
|  |  | | | Assignment |
|  |  | | | **(30)** |
| Tuesday Oct. 18 | **Trace Evidence / Lab Safety Training**  Fiber analysis basics | | | **Flames of Justice Assignment Due** |
|  | **Lab #1b – Fiber Analysis (Formal Lab Report)** | | | **Saferstein Chapter 11 –**  Hairs and Fibers |
|  |  | | | Formal Lab Report  **(100)** |
| Thursday Oct. 20 | **Formal Lab Report Rubric and Preliminary Writing – Wayne Williams case** | | |  |
| Tuesday | **Impression Evidence** | | | **Saferstein Chapter 18-** |
| Oct. 25 | Handwriting analysis | | | Document Examination |
|  | Howard Hughes case study assignment | | | **Handwriting** |
|  | (In class) | | | **assignment** |
|  |  | | | **(20)** |

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| Thursday Oct. 27 | **Lab #3 – Questioned Documents Lab** |  |
| Tuesday Nov. 1 | **Fingerprinting**  Bertillon activity, fingerprint identification | **Saferstein Chapter 6 –**  Fingerprints |
| Thursday Nov. 3 | **Lab #4 – Fingerprinting**  Ten print cards, identification, and classification assignment (In class)  Ridge pattern identification (In class) | **Fingerprint assignments (20)** |
| Tuesday Nov. 8 | **Forensic Serology**  Blood basics, blood typing and inheritance  **Lab #5 - Blood Identification and Typing** | **Saferstein Chapter 15-**  Forensic Serology |
| Thursday Nov. 10 | **Introduction to Bloodstain Pattern Evidence**  Stephen Scher case study (In class) | **Saferstein Chapter 4-** Crime Scene Reconstruction – Bloodstain Pattern Analysis  **Stephen Scher Case Study Assignment (10)** |
| Tuesday Nov. 15 | **Lab #6 – Bloodstain Pattern Analysis Part I** Height of blood drop graphing analysis and calculations assignment (In class) | **Saferstein Chapter 4**  **Bloodstain Pattern data analysis**  **(20)**  **Formal Lab Report Due** |
| Thursday Nov. 17 | **Lab #6 – Bloodstain Pattern Analysis Part II**  Angle of impact |  |
| Tuesday Nov. 22 | **Introduction to Forensic DNA Analysis** Structure and function, restriction enzymes, gel electrophoresis, RFLP technique | **Saferstein Chapter 16-** DNA: The Indispensable Tool |
| Tuesday Nov. 29 | **Lab #7 – DNA Fingerprinting Part I**  Pipetting practice Preparing restriction digests  RFLP assessment assignment (In class) | **RFLP assessment (15)** |
| Thursday Dec. 1 | **Lab #7 – DNA Fingerprinting Part II** Gel electrophoresis and DNA staining/detection  Interpretation of results | **RFLP assessment (15)** |

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| Tuesday Dec. 6 | **Criminal Profiling/Serial Killers**  Criminal profiling, organized vs. disorganized serial killers  Ted Bundy case study  Ted Bundy profile construction |  |
| Thursday Dec. 8 | **Final Exam Review Session** |  |
| **Thursday Dec. 15**  **Tuesday Dec. 20** | **Final Exam – 6:30pm in DS244 4-6pm group**  **Final Exam – 9am in DS244 1:40-3:40pm group** | **Final Exam (200)** |

**Diversity-Justice infused into these topics and assignments**