Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI100: Forensic Science 100

Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math, and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

This course is an introduction to the Forensic Science pathway. Students will learn about the science and history behind crime detection and the roles of forensic scientists. Students will discover how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Students will engage in evidence collection and basic laboratory and analytical tasks. Students will find out about the limits of eye witness evidence and the analysis of different types of physical evidence including documents, teeth marks, footprints, tool marks, tire marks, and handwriting. Students will also explore the foundations of physics, biology and chemistry and their application to forensic science. Students will participate in creating and conducting an independent research project for the Science Fair.

Work-Based Learning

Students will be connected with professionals in the forensic science field through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Pre-Requisites

N/A

Course Objectives

Students will:

1. Use the scientific method to solve an investigation.
2. Explain the limitations of eyewitness accounts.
3. Document and process evidence from a crime scene.
4. Perform comparative analysis on forensic evidence (documents, handwriting, impression evidence).
5. Engage in argument from evidence.
6. Plan and carry out an independent research project.
7. Explain how DNA is used in forensic investigations.
8. Explain how physics is used in forensic science.
9. Explain the professional, legal, and ethical responsibilities of forensic science professionals.

Integrated Academics

N/A

Concurrent Enrollment College Credit

N/A

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials
- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbook

Brown, R., & Davenport, J. (2016). *Forensic Science: Advanced Investigations.* Boston, MA: Cengage Learning.

Saferstein, R. (2014). *Criminalistics: An Introduction to Forensic Science, 11th Edition.* New York: Pearson.
Spencer, J. T. (2012). *Introduction to Forensic Science: The Science of Criminalistics.* Boston, MA: Cengage Learning.

Grading

25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.

25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.

25% **Projects**

25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences.

(These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.)

Additional Course Policies

- **Assignments:** In order to receive full credit, work must be complete before the bell rings on the day it is due. Late or incomplete work is NOT accepted for full credit. If an absence is excused, students will have as many days as they were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. It the students' responsibility to organize and keep track of their assignments! Most work will be turned in as a packet at the end of a unit or electronically via email or other means.
- **Labs:** Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.
- **Lab Safety:** In case an accident occurs, report it immediately! Let the instructors decide on the proper course of action. Those not involved should clear the area.
- **Exams:** It is the student's responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following their return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.
- **Academic Integrity Policy:** Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Course Calendar

Quarter	Units of Study
1	• Culture • Crime Scene Investigation • Mystery of the Romanov Family • Eyewitness Evidence
2	• Forensic Document Analysis • Impression Evidence: Teeth Marks, Footprints, Tool Marks, Tire Marks
3	• Impression Evidence: Teethmarks, Footprints, Toolmarks, Tiremarks (continued) • Science Fair/Independent Research • Forensic Chemistry: Handwriting and Chromatography • Forensic Biology
4	• Forensic Physics: Crash Curriculum and Egg Drop • Forensic Science in Society, History and Literature • Final Examination • Portfolio

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
Forensic Science 100: Intro to Forensic Science

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Week 1-2 **Culture**	• What are the expectations of this class?	• Get to know each other • Describe class expectations and rules • Describe what respect looks like • Demonstrate responsibility and work as a team • Describe examples of resilience • Write a claim and support with evidence • Vocabulary: CTE, Resilience, Grit, Tenacity, Evidence, Claim	• Activity: Getting to Know Each Other • Activity: Skittles Restorative Circle • Activity: Name Games • Extension: Trust Building • Gallery Walk: What does Respect Look Like? • Presentation: What does Respect Look Like? • Presentation: Who Am I?	• Act as a responsible and contributing citizen and employee. • Communicate clearly and effectively and with reason. • Consider the environmental, social and economic impacts of decisions. • Work productively in teams while using cultural global competence.	**WHST 1**
Week 2-6	• How are the basics of science used in forensics?	• Use the scientific method to solve an investigation • Write a hypothesis • Write a claim and support with evidence	• Activity: Crime Scene KWL • Lab: Candy Evidence Collection • Lab: Deadly Picnic Crime Scene Sketch	• Act as a responsible and contributing citizen and employee.	**RST1-6** **WHST 1-2, 4, 6, 10**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Crime Scene Investigation	• How can the scientific method help solve problems? • What procedures are implemented at a crime scene and why are they important?	• Explore the functions of a crime lab and role of a forensic scientist • Work as a productive member of a team. • Accurately sketch a crime scene • Conduct a systematic search of a mock crime scene. • Demonstrate correct techniques of collecting and packaging evidence at a crime scene. • Collect evidence from a crime scene • Evaluate evidence to support a claim • Utilize critical thinking skills to reach a conclusion • Build and demonstrate mutual trust amongst peers • Work in a team to fulfill a common goal • Vocabulary: motive, recognition, consensus, hypothesis, evidence, microscopically, shortchanged,	• Debate: Crime Scene Processing Timeline • Writing: CER Crime Scene Report blog • Activity: Case of the Missing Computer Chip Crime Scene Vocabulary • Writing: Case of the Missing Computer Chip Timeline & Newspaper Article • Activity: FBI Crime Lab Function ThingLink • Writing: CER CSI Report • Activity: Case of the Missing Computer Chip Timeline • Guest Speaker: CSI/Detective • Activity: Inside The FBI Crime Laboratory - NatGeo TV • Discussion: Inside The FBI Crime Laboratory • Lab: CSI Web Interactive • Parts of Crime Labs • Extension: CSI Web Adventures Cases 2-4 • Movie Notes: United Streaming Value of Evidence	• Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Utilize critical thinking to make sense of problems and persevere in solving them. • Model integrity, ethical leadership and effective management. • Work productively in teams while using cultural global competence.	**CCSM 1, 2, 4-6** **NGSSP** **1,2,5-8** **HS-ETS1-1** **HS-PS2-3**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		miscellaneous, accumulating, algorithm, fiber			
Weeks 7-12 **Mystery of the Romanov Family**	• What is the mystery of the Romanov family? • How did Forensic Scientists solve the mystery of the Romanov family identities?	• Describe the mystery of the Romanov family • Describe the mystery of Anna Anderson's identity • Practice forensic examination skills • Draw and interpret a pedigree to calculate age, disease, heredity, etc. • Evaluate genetic inheretince with Punnett squares • Describe hemophilia and its genetic inheritance • Identify an individual based on their ear characteristics • Describe different types of evidence used by forensic scientists to identify Anna Anderson • Describe DNA tests performed by Forensic Scientists • Extract DNA • Differentiate between mitochondrial and nuclear DNA	• Activity: National Geographic Movie Discussion • Activity: Interpret Royal Family Pedigree • Project: What is hemophilia? Infographic Piktochart • Activity: Romanov Family Evidence Webquest • Lab: Ear Identification Test • Close Reading: Ear Identification • Summary: Amicus Curiae brief • Close Reading: Anastasia DNA Identification • Summary: Romanov blog • Lab: Strawberry DNA Extraction • Lab: Long Bone Identification & Measurement • Assessment: End of Unit Self-Reflection	• Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Utilize critical thinking to make sense of problems and persevere in solving them. • Use technology to enhance productivity	**RST 1-4, 7-10** **WHST 1-2, 6-10** **CCSSMP 1, 3-5, 7-8** **NGSSP** **1, 6-8** **HS-LS3-1** **HS-LS3-3**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		• Identify the sex of skeletal bones • Identify bones used in anthropology • Vocabulary: Tsar/Czar, pedigree, hemophilia, qualitative, quantitative,			
Week 13-15 **Eyewitness Evidence**	• Is eyewitness evidence reliable? • How is a composite sketch made? • What is the role of a Forensic Artist?	• Discuss the limitations of eyewitness accounts • Explain factors that can influence visual memory • Create a composite sketch • Describe difference types of evidence: differentiate between physical evidence & testimonial evidence • Discuss the role of eyewitness evidence in the criminal justice system • Describe and practice the role of a Forensic Artist	• Activity: Observation Skills • Eyewitness Basics Notes • Lab: Composite Sketching • Close Reading Annotation: Forensic Artist • Extension: Memory Match Game • Extension: Art of Crime Detection Virtual Lab • Article Annotation: Eyewitness Misidentification • CER: Should eyewitness testimony be allowed in courtrooms? • Debate: Who started the lunch room food fight? • Eyewitness: Lunchroom Fight • Composite Sketching & Forensic Art: Co-teaching with E. Williams • FACES composite sketch	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Demonstrate creativity and innovation. • Employ valid and reliable research strategies. • Use technology to enhance productivity.	**RST 1-3, 6-8, 10** **WHST 1-3** **CCSM 1, 3, 5** **NGSSP** **1,3, 6-8** **HS-ETS1-4**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Week 16-18 **Forensic Document Analysis**	• What documents are reviewed in forensic investigation? • How is handwriting analyzed and compared?	• Discuss the value and issues of eyewitness evidence • Evaluate forgery • Compare source and known handwriting samples • Determine what a questioned document is and identify examples of it. • Analyze handwriting and identify its individual characteristics. • Recognize different types of altered documents and the techniques used to analyze them. • Describe the concept of comparative analysis • Describe the science of handwriting analysis	• Activity: Lindergh case review and summary • Document Examination notes • Lab: Handwriting Analyis and Forgery Interpretation • Lab: 4th Amendment Handwriting Analysis: 12 characteristics • Article Annotation: Mark Falzini new findings •	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Use technology to enhance productivity. • Utilize critical thinking to make sense of problems and persevere in solving them.	**RST 1-3, 6-8, 10** **WHST 1-3** **CCSM 1, 3, 5** **NGSSP** **1, 3, 6-8** **HS-ETS1-4**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Week 19-24 **Impression Evidence:** **Teethmarks, Footprints, Toolmarks, Tiremarks**	• What are examples of impression evidence left at crime scenes? • How is impression evidence analyzed? • How can paint chips be observed, compared, and used to prove ownership?	• Explore the various types of physical evidence that can be found at a crime scene and learn how they are used to help investigators • Distinguish between various types of impression evidence. • Differentiate between class and individual characteristics. • Provide examples of how impression evidence gives clues about the crime scene, person(s) at the crime scene, and events that occurred at the scene • Provide well-supported arguments that evidence such as foot, shoe, and dental impression is usually considered class evidence	• Footprint Lab • Footprint crime scene drawing • Toolmark Lab (sample impressions in clay) • Toolmark Challenge (matching unknown tools to known sample) • Bite Mark Evidence (with candy) • Bite Mark Challenge • Activity: Caliper Tool Reading • Tire mark Lab • Guest: Officer Police Dept Firearms ID • Footwear Impressions Lab • Footwear Impressions Comparison • Hot wheels tire tracks lab • Real Deal: Tire Track Class Challenge (match unknown tracks to tracks lab)	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Utilize critical thinking to make sense of problems and persevere in solving them. • Use technology to enhance productivity. • Work productively in teams while using cultural global competence.	**RST 1-2, 4-5, 7-8, 10** **WHST 1-2, 4, 6, 10** **CCSM 1-3, 5** **NGSSP** **1-4, 6-8** **HS-ETS1-2** **HS-PS1-5** **HS-PS2-6**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		• Distinguish among latent, patent, and plastic impressions • Summarize the significance of foot and shoe impression evidence, and outline procedures for collecting impression evidence from different types of surfaces • Describe the features of tire impressions and skid marks used to help identify tire(s) or a vehicle's wheelbase, track width, and/or turning diameter • Compare and contrast skid marks, including how they are produced, when they are produced, what they look like, and how they can be used to reconstruct events leading to a collision			

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		• Summarize the methods used to produce an impression or cast • Analyze impression evidence to determine if it consistent with evidence from a crime scene • Collect and preserve footwear impression left on soil by plaster casting.			
Weeks 25-29 **Science Fair/Independent Research**	• How do Forensic Scientists plan and carry out investigations? • How do Forensic Scientists construct explanations and design solutions?	• Create an experimental research question • Write a hypothesis to test a research question • Use credible sources to compile background research on a topic • Outline and draft a background research paper • Write a testable hypothesis statement • Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis	• Brainstorm Activity • Research Plan and Project Proposal Conference • Credible Source Pyramid and Analysis • Activity: Research Notes • Research Background Writing Outline • Science Fair Journal Reflection • Lab: Conduct Research Experiment • Collect and Display Data in Graph form • Analyze data and summarize conclusions	• Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Demonstrate creativity and innovation. • Employ valid and reliable research strategies. • Utilize critical thinking to make sense of problems	**CCSL-**RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,7,8,9 • **CCSM** 1, 2, 3, 4, 5, 6, 7, 8 **NGSSP** **1, 3-8** **HS-ETS1-1** **HS-ETS1-2** **HS-ETS1-3**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		• Create a data table to collect quantitative and qualitative data • Create a graph to display quantitative data • Analyze data for patterns and trends • Draft conclusions from data to support or abandon hypothesis and explain results • Prepare a research presentation display board • Present research conclusions to a public audience • Reflect and revise work	• Project: Science Fair Display Board Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	and persevere in solving them. • Use technology to enhance productivity. • Work productively in teams while using cultural global competence. •	
Week 30-32 **Forensic Chemistry: Handwriting &** **Chromatography**	• What is Chemistry? • How is Chemistry used in Forensic Science?	• Describe the concept of comparative analysis • Describe the science of handwriting analysis • Separate a mixture of inks • Explain the concept of chromatography • Describe the difference between a physical and chemical change	• Handwriting Analysis • Intro to Coding/Digital Forensics • Ink Chromatography Test sample pens • Match unknown pens • Guest: Digital Forensics Expert • Arson Investigator • Physical vs Chemical Change: Butter Lab • Evaluation of Items with similar chemical composition: How sweet it is • Phase Changes: Melting Apples • Newton's Law of Cooling: Spuds	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Attend to personal health and financial well-being. • Communicate clearly and effectively and with reason.	**RST 1-2, 4-5, 7-8, 10** **WHST 1-2, 4, 6, 10** **NGSSP** **1-4, 6-8** **HS1-PS1-1**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
		• Explain the difference between a mixture, solution and colloid • Analyze physical and chemical properties of evidence collected from a crime scene. • Analyze physical and chemical properties of evidence collected from a crime scene.		• Consider the environmental, social and economic impacts of decisions. • Demonstrate creativity and innovation. • Employ valid and reliable research strategies. • Utilize critical thinking to make sense of problems and persevere in solving them. • Model integrity, ethical leadership and effective management. • Plan education and career paths aligned to personal goals. • Use technology to enhance productivity. • Work productively in teams while using cultural global competence.	**HS1-PS1-2**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Week 33-35 **Forensic Biology**	• What is DNA? • How is DNA used in Forensic Science investigations?	• Diagram the DNA molecule • Explain how DNA is used in forensic investigations • Explain the 4 types of macromolecules • Explain how indicators are used in chemical analysis • Support a claim with evidence	• Strawberry DNA Extraction • DNA Foldable • Measurement Metric System • Macromolecule Foldable • Intro to DNA • Germicide Cafeteria • Who killed the Chef? • Who Stole Jerell's iPod? (Macromolecules Indicators) • Guest: Medicolegal Death Forensics Bio SU Grad Student	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Attend to personal health and financial well-being. • Consider the environmental, social and economic impacts of decisions. • Utilize critical thinking to make sense of problems and persevere in solving them. • Model integrity, ethical leadership and effective management. • Use technology to enhance productivity. • Work productively in teams while using cultural global competence.	**RST 1-2, 4-5, 7-8, 10** **WHST 1-2, 4, 6, 10** **CCSSMP 2-5, 7** **NGSSP** **1-4, 6-8** **HS1-LS1-1** **HS1-LS1-3** **HS1-LS1-6** **HS1-PS1-5**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices

Week 36-38
 	
Forensic Physics: Crash Curriculum & Egg Drop
	• How is Physics used in Forensic Science?
	• How can accidents be reconstructed?
	• How can it be determined if a vehicle has been tampered with or if it was accidental?
		• Perform vehicular accident reconstruction
		• Analyze a vehicle's condition to understand if a scenario is an accident or caused intentionally
		• Explain and apply Newton's laws of motion to crime scene reconstruction
		• Design an solution for an engineering challenge
			• CRASH notes (Newton's Laws, vehicle dynamics, occupant dynamics)
			• Present care
			• Student investigation
			• Discussion of results
			• CRASH curriculum
			• Accident Scene reconstruction
			• Egg Drop Competition
			• Service Project
			• Guest: Crash Scene Reconstruction
			• CSI Geocaching Activity (intro to crime mapping?)
			  • Accident Scene Reconstruction Worksheets
			  • Hands on laboratory in the automotive bay. Analysis of automobile's condition.
				• Act as a responsible and contributing citizen and employee.
				• Apply appropriate academic and technical skills.
				• Communicate clearly and effectively and with reason.
				• Consider the environmental, social and economic impacts of decisions.
				• Demonstrate creativity and innovation.
				• Employ valid and reliable research strategies.
				• Utilize critical thinking to make sense of problems and persevere in solving them.
				• Use technology to enhance productivity.
				• Work productively in teams while using
					RST 1-2, 4-5, 7-8, 10
					
					WHST 1-2, 4, 6, 10
					
					NGSS
					
					1-8
					
					HS-PS3-1
					
					HS-PS3-2
					
					HS-PS3-3
					
					HS-ETS1-2
					
					HS-ETS1-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
				cultural global competence.	
Week 39-40 **Forensic Science in Society, History & Literature**	• What is legally and ethically expected of Forensic Scientists and Crime Scene Investigators? • Who's Who in Forensic Science?	• Describe the influence of media (Sherlock Holmes, crime scene novels, television shows) on Forensic Science • Explain the "science of deduction" • Explore the history and legal responsibilities of forensic science. • Recognize the major contributors to the development of forensic science. • Illustrate the history of forensic science. • Identify career-related information that is relative to making career decisions. • Summarize the ethical standards of a forensic scientist. • Distinguish between different roles in the forensic science field	• Legal Jurisdictions • Close Reading: Sherlock Holmes • Deflate Gate • CSI Effect • Career Research Presentation • Guest: Expert Witness/Medical Examiner	• Attend to personal health and financial well-being. • Communicate clearly and effectively and with reason. • Consider the environmental, social and economic impacts of decisions. • Demonstrate creativity and innovation. • Employ valid and reliable research strategies. • Plan education and career paths aligned to personal goals. • Use technology to enhance productivity.	**RST 1-2, 7-10** **WHST 2, 4-10**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CTE Standards	CCSS, Literacy, Math, NGSS Science & Engineering Practices
Final Examination **Portfolio**	• What are the main learning goals for this past year in forensic science?	• Complete the assessment demonstrating a thorough knowledge of forensic science and crime scene investigation	• Crime Scene Simulations: Photography, Sketch, Search, Mutual Aid, Search & Seizure, Final examination • Scenario Evaluations • Course Evaluations • What's Your Advice? • Letter to Yourself	• Act as a responsible and contributing citizen and employee. • Apply appropriate academic and technical skills. • Communicate clearly and effectively and with reason. • Use technology to enhance productivity.	

Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI200: Forensic Science 200

Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math, and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

This is the second course in the Forensic Science pathway. In this course, students will continue to develop their forensic science skills as they learn about more advanced crime scene investigation procedures and the probative value of evidence. They will be able to differentiate between class evidence and individual evidence as they collect and analyze hair evidence and fingerprints and other physical evidence such as skeletal and dental remains, and impression evidence and blood serology. Students will participate in creating and conducting an independent research project for the Science Fair. Student will also explore criminal justice issues in their community through crime mapping and participate in a final crime scene technician simulation to apply the skills they have learned.

Work-Based Learning

Students will be connected with professionals in the forensic science field through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Pre-Requisites

CSI100: Forensic Science 100

Course Objectives

Students will:

1. Describe the probative value of evidence.
2. Differentiate between class and individual evidence.
3. Use evidence to identify an individual.
4. Explain and demonstrate correct techniques to collect and package crime scene evidence.
5. Engage in argument from evidence.
6. Explain the professional, legal, and ethical responsibilities of forensic science professionals.
7. Perform comparative analysis on fingerprints, hair, skeletal and dental remains, impressions, and blood.
8. Plan and carry out an independent research project.
9. Research and address issues of crime in the community.

Integrated Academics

1 CTE Integrated Science Credit

Concurrent Enrollment College Credit

N/A

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials
- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbooks

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Grading

25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
25% **Projects**
25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences.
These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

Additional Course Policies

- **Assignments:** In order to receive full credit, work must be complete before the bell rings on the day it is due. Late or incomplete work is NOT accepted for full credit. If an absence is excused, students will have as many days as they were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. It the students' responsibility to organize and keep track of their assignments! Most work will be turned in as a packet at the end of a unit or electronically via email or other means.
- **Labs:** Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.
- **Lab Safety:** In case an accident occurs, report it immediately! Let the instructors decide on the proper course of action. Those not involved should clear the area.
- **Exams:** It is the student's responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following their return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.

- **Academic Integrity Policy:** Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Course Calendar

Quarter	Units of Study
1	• Forensic Science Skills • Probative Value of Evidence • Crime Scene Investigation Procedures • Historical Foundations of Forensic Science • Class Evidence: Hair Analysis
2	• Individual Evidence: Fingerprints • Physical Evidence: Skeletal Remains and Forensic Dentistry

3	• Science Fair • Impression Evidence • Serology: Blood Typing
4	• Crime Mapping and Criminal Justice Issues • Crime Scene Technician Simulation • Portfolio

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI200: Forensic Science 200

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 1-2 **Forensic Science Skills**	• What are the expectations of this class? • Why is lab safety vital in science?	• Demonstrate safe practices in labs and field investigations. • Write a claim and support with evidence. • Exhibit appropriate behavior in the lab. • Perform the steps of laboratory protocols accurately and in sequence. • Follow standard operating procedures for maintaining a lab manual following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion).	• Building Rules: Qualities of a Good/ Bad Teacher, Student • Annotation: Rose that Grew from Concrete • Summary Tweet: Rose that Grew from Concrete • Vocabulary Presentation: Forensic Science Disciplines • Google Presentation Slide: Lab Safety • Set-Up Composition Lab Notebook • Lab: Ooblek-Is it a Solid or Liquid? Claim-Evidence-Reason • Uniform inspection • Professional Email Account	**Career Ready Practices** CRP 1,3,4,5,9,11,12 **Cluster Standards** HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 5 **Science** NGSSP 3 HS-PS1-3
Weeks 3-5 **Probative Value of Evidence**	• What is legally and ethically expected of forensic scientists and crime scene investigators? • How can scientific methods help solve problems?	• Identify and describe the CSI Effect. • Explain how science is used to solve crimes. • Describe the importance of physical evidence. • Explain how evidence is used to convince a jury of guilt. • Describe the probative value of evidence. • Differentiate between class and individual evidence. • Use evidence to identify an individual. • Demonstrate appropriate use of personal protective devices and proper glove disposal technique.	• Close Reading: CSI Effect • Summary: CSI Effect • Anticipation Guide: Criminal Justice System • Close Reading: “Six Astonishing Mistakes that will Make you Rethink the Death Penalty” • Notes: Crime Science • Lab: Class vs Individual Evidence • Lab: Garbage-ology • Presentation: Suspect Identification • Guest Speaker: Evidence, CSI Effect	**Career Ready Practices** CRP 1,3,4,5,9,11,12 **Cluster Standards** HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** **Science** HS-ETS1-2
Weeks 6-8 **Crime Scene Investigation Procedures**	• How is evidence collected and analyzed? • What is the value of evidence? • What procedures are implemented at a crime scene and	• Work as a productive member of a team. • State and describe the steps in processing a crime scene. • Demonstrate crime scene sketching. • Measure the boundaries of a crime scene.	• Scenarios: Process Crime Scene Mistakes • Lab: Trace Evidence Lab • Lab: Chain of Custody • Lab: Crime Scene Sketch Reconstruction • Ethical Case Studies Scenarios: Crime Scene Processing Mistakes	**Career Ready Practice** CRP 1,2,4,8,9,11,12 **Cluster Standards** HL 3 LW 3 ST 1,2	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	why are they important? • What is legally and ethically expected of forensic scientists and Crime Scene Investigators?	• Reconstruct a crime scene from pieces of evidence. • Explain and demonstrate correct techniques to collect and package crime scene evidence. • Demonstrate proper handling of evidence and chain of custody documentation.		**Pathway Standards** HL-BRD 1 LW-ENF 1,4,12 ST-SM 2,3	**Math** MP 1,2,4,5,6 **Science** NGSSP 1,2,5,6,7,8 HS-ETS1-2
Weeks 9-10 **Historical Foundations of Forensic Science**	• How has forensic science developed over time? • What is a crime scene lab and how does it work?	• Describe the legal responsibilities of forensic science professionals within and outside of the courtroom. • Illustrate the history of forensic science. • Summarize what a crime lab is and how it works. • Explain J. Edgar Hoover's contributions to the formation of the FBI. • Describe the federal programs established in the United States to investigate crimes (Homeland Security, INTERPOL, ATF, FBI, US Attorney General, U.S. Marshal's Service). • Prepare a mission and vision statement for a police agency or crime lab. • Explain the organization of the crime laboratory and detail the functions it serves. • Compare and contrast a crime lab from another jurisdiction (state, county, city).	• Infographic: Criminal Justice System • History of Forensic Science Prezi • Movie Notes: History Channel-FBI Crime Lab • Venn Diagram: Organization of Crime Lab • Case Study: Halloween History Horror	**Career Ready Practice** CRP 1,2,4,7 **Cluster Standards** HL 1 LW 1,5 ST 4 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6 ST-SM 2,3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** **Science**
Weeks 11-13 **Class Evidence: Hair Analysis**	• How are microscopes used in forensic science? • How is hair evidence analyzed and used in investigations?	• Identify parts and functions of a microscope. • Use a microscope effectively in the lab setting. • Competently focus a compound microscope. • Prepare slides of hair evidence and cuticle impressions. • Sketch detailed views of objects as seen through a microscope.	• Lab: Microscope Structure Identification • Paper Bindle: Collect Trace Evidence in the Field • Activity: Hair Impression Slides • Notes: Identify Hair Structures • Venn Diagram: Animal vs Human Hair • Lab: Animal and Human hair Comparison • Lab: Identify an unknown hair • Activity: Categorizing somatic and racial differences	**Career Ready Practice** CRP 2,8,11,12 **Cluster Standards** HL 1 LW ST 1,2,6 **Pathway Standards** HL-BRD LW-ENF 1,5 ST-SM 1,2,4	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 1,2,5,6 **Science** NGSSP 1,2,3,7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Identify hair structures: medulla, cortex, cuticle, cortical fuci, pigment granules and ovoid bodies. • Identify different medulla and cuticle patterns using a microscope. • Differentiate between animal and human hair. • Identify species that hair originated from. • Summarize the importance of the presence of DNA in analyzing hair evidence. • Identify signs of violence shown by hair evidence. • Describe how to determine natural vs. dyed hair, cut vs. uncut hair. • Give examples of how chemical analysis of hair can provide clues in a crime such as in a poisoning, heavy metal exposure, drug use or nutritional issues. • Identify the racial and somatic origin of unknown hairs based on their characteristics.	• Lab: Characteristics of Hair Scales Lab • Activity: Teach a Hair Lesson • Activity: Murder in the Hair Salon • Light Diffraction Hair Diameter Lab		HS-ETS1-2
Weeks 14-16 **Individual Evidence: Fingerprints**	• How and when was the science of fingerprints discovered? • What are the requirements for a quality set of fingerprints? • What are different methods of developing Fingerprints? • How do they develop fingerprints that may not be visible?	• Describe the history of fingerprinting. • Describe the structure and function of the skin. • Explain how ridge patterns are caused in skin. • Compare the three major fingerprint patterns of arches, loops, and whorls, and their respective subclasses. • Describe the fingerprint minutiae (major characteristics of fingerprints): ending ridge, fork, island ridge, dot, bridge, spur, eye, double bifurcation, delta, trifurcation. • Explain the importance of the Locard Exchange Principle in forensic science. • Apply proper procedures for dusting a crime scene for collecting latent fingerprints.	• Fingerprint Minutiae Notes • Lab: Fingerprint Comparison Analysis • Lab: Magnetic Powder Dusting • Activity: History of Fingerprinting Timeline • Project: Fingerprint Minutiae Model • Activity: Fingerprint Lifting Digital SKILLS USA Lesson (blog, podcast, video) • Fingerprinting Privacy and Identification Op-Ed (IAFIS)	**Career Ready Practice** CRP 2,8,11 **Cluster Standards** HL 1 LW 2 ST 2,6 **Pathway Standards** HL-BRD 6 LW-ENF 1,6,12 ST-SM 2,4	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Demonstrate the ability to properly lift and mount a latent fingerprint from a designated item of evidence. • Demonstrate the proper procedure for marking a latent fingerprint card. • Determine if a fingerprint matches a fingerprint on record. • Analyze the privacy and security trade-offs of using fingerprinting identification in society.			
Weeks 17-20 **Physical Evidence: Skeletal Remains and Forensic Dentistry**	• How are physical remains identified? • What are characteristics of physical evidence and remains?	• Describe how teeth are used in forensic identification. • Name and number deciduous (baby) and permanent teeth. • Employ dentition patterns as a means for bite mark identification. • Compare and contrast bite mark patterns antemortem and postmortem. • Describe the use of forensic dentistry in regards to mass disasters and body identification.	• Case Study: 9/11 Forensic Science Dentistry Identification • Lab: Odontology Identification Bite Mark Impression Lab • Case Study: Ted Bundy • Teeth analysis • Odontology lab with radiographs and teeth molds	**Career Ready Practices** CRP 2,4,8,10,11 **Cluster Standards** HL 1 LW 1,2,4 ST 2, 6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 1,3,5 **Science** HS-LS1-2
Weeks 21-26 **Science Fair**	• How do forensic scientists plan and carry out investigations? • How do forensic scientists construct explanations and design solutions?	• Create an experimental research question. • Write a hypothesis to test a research question. • Use credible sources to compile background research on a topic. • Outline and draft a background research paper. • Write a testable hypothesis statement. • Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. • Create a data table to collect quantitative and qualitative data. • Create a graph to display quantitative data. • Analyze data for patterns and trends. • Draft conclusions from data to support or abandon hypothesis and explain results.	• Brainstorm Activity • Research Plan and Project Proposal Conference • Credible Source Pyramid and Analysis • Activity: Research Notes • Research Background Writing Outline • Science Fair Journal Reflection • Lab: Conduct Research Experiment • Collect and Display Data in Graph form • Analyze data and summarize conclusions • Project: Science Fair Display Board • Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	**Career Ready Practice** CRP 2,4,6,7,8,11,12 **Cluster Standards** HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 1,2,3,4,5,6,7,8 **Science** NGSSP 1,3,4,5,6,7,8 HS-ETS1-1,1-2,1-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Prepare a research presentation display board. • Present research conclusions to a public audience. • Reflect on and revise work.			
Weeks 27-30 **Impression Evidence**	• How do crime scene investigators examine tool mark impressions, bullet fragments, and bullet holes?	• Explain the individual characteristics of tool marks. • Identify characteristics of bullet and cartridge cases. • Explain laboratory methodologies used to determine whether an individual has fired a weapon, such as identifying gunshot residue. • Describe the type of information available through the National Integrated Ballistics Information Network.	• Toolmark Analysis Experiment • Firearms and Trajectory Activity: Inquiry Lab: Marshmallow Shooters Testing • Firearms and Tool Marks Examination • Case Studies: JFK, Oscar Pistorius • Frontline: Ring of Fire- The Crisis of American Made Handguns • Ballistics NOVA: Who Shot JFK?	**Career Ready Practice** CRP 2,4,6,8,11,12 **Cluster Standards** HL 1 LW ST 1,2,6 **Pathway Standards** HL-BRD LW-ENF 1,5 ST-SM 1,2,4	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 2,3,4,5,7 **Science** NGSSP 1,2,3,4,6,7,8 HS-1LS3-1,3-3
Weeks 31-33 **Serology: Blood Typing**	• What is serology and how is it used to solve crimes?	• Identify the components and chemical properties of blood. • List the components of blood. • Identify the antigens and antibodies that determine ABO blood types and the Rh factor. • Use a Punnett Square to determine blood type probabilities. • Apply the use of a Punnett Square to solve paternity questions.	• Blood Basics Notes • Lab: Who's the Daddy? Blood Type Laboratory • Punnett Square Blood Type Activity • Blood Quiz	**Career Ready Practice** CRP 2,4,8,11,12 **Cluster Standards** HL 1 LW ST 1,2,6 **Pathway Standards** HL-BRD LW-ENF 1,5 ST-SM 1,2,4	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 2,3,4,5,7 **Science** NGSSP 1,2,3,4,6,7,8 HS-1LS3-1,3-3
Weeks 34-37 **Crime Mapping and Criminal Justice Issues**	• What is a crime mapping? • What is GIS? • What crimes occur in our community? • How do forensic scientists develop and use models? • How do forensic experts obtain, evaluate and communicate information?	• Identify methods for measuring crime. • Interpret a topographical map. • Read a compass. • Identify relevant issues in the community. • Design and carry out a service project to address a community need.	• NAMIS: Missing Persons Search • Current Events Summary Blog/Newspaper Article • Twitter Map • Co-Curricular GIS Map creation • Service Project	**Career Ready Practice** CRP 2,4,5,6,7,8,11,12 **Cluster Standards** HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6 **Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7 **Math** MP 1,2,3,4,5,6,7,8 **Science** NGSSP 1,2,3,4,5,6,7,8

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Weeks 38-40 **Crime Scene Technician Simulation** **Portfolio**	• What have you learned this year? • What is the role of a crime scene investigator?	• Work as a member of team. • Work in cross-curricular groups. • Compile accomplishments in a resume. • Write a cover letter. • Explore and identify various fields of expertise in forensic science. • Describe the different education and training requirements for the various careers in forensic science.	• Practical Exam: Crime Scene Scenario • Portfolio: Resume, Cover Letter • Presentation • Interview of professional working in the field of forensic science	**Career Ready Practice** CRP 1,2,3,4,5,9,10,11,12	**ELA** 9-10R 1,2,4,7,8,9 9-10W 1,2,5,6,7 9-10SL 1,2,3,4,5,6 9-10L 1,2,3,4,5,6
				Cluster Standards HL 3 LW 3 ST 1,2	**Literacy** 9-10RST 1,2,3,4,5,6,7,8 9-10WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 1 LW-ENF 1,4,12 ST-SM 3	**Math** MP 1,2,3,4,5,6,7,8
					Science NGSSP 1,3,4,5,6,7,8

Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI300: Forensic Science 300

Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math, and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

This is the third course in the Forensic Science pathway. This course provides an overview of the criminal justice system and introduces specialized forensic topics including the U.S. justice system, and the history and role of forensic science in the legal system. As part of this course, students will be enrolled in CRJ 101: Criminal Justice Systems at Onondaga Community College which includes study of police, the court system, the correctional systems, and other discretionary and ethical issues in the criminal justice field. Students will participate in creating and conducting an independent research project for the Science Fair. Students will refine their knowledge and skills as they learn more advanced crime scene investigation techniques, such as crime scene photography, fiber analysis, and the identification of physical remains. Students will examine the role of forensic pathologists in forensic science and how the areas of toxicology, forensic psychology, and forensic ecology are applied in criminal investigations. Finally, students will participate in a mock court simulation to apply the skills they have learned

Work-Based Learning

Students will be connected with professionals in the forensic science field through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Pre-Requisites

CSI100: Forensic Science 100, and CSI200: Forensic Science 200

Course Objectives

Students will:

10. Explain the legal foundations for criminal justice in the United States.
11. Explain the professional, legal, and ethical responsibilities of Forensic Science professionals.
12. Document and process evidence from a crime scene.
13. Perform comparative analysis on fiber evidence and human remains.
14. Engage in argument from evidence.
15. Explain the role that pathologists play in forensic science
16. Describe the fields of toxicology, forensic psychology and forensic ecology.
17. Plan and carry out an independent research project.

Integrated Academics

1 Integrated Science Credit

Concurrent Enrollment College Credit

Upon successful completion of Forensic Science 300, students will earn 3 college credits for CRJ 101: Criminal Justice Systems from Onondaga Community College.

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials

- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbooks

Brown, R., & Davenport, J. (2016). *Forensic Science: Advanced Investigations.* Boston, MA: Cengage Learning.
Saferstein, R. (2014). *Criminalistics: An Introduction to Forensic Science, 11th Edition.* New York: Pearson.
Spencer, J. T. (2012). *Introduction to Forensic Science: The Science of Criminalistics.* Boston, MA: Cengage Learning.

Grading

25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
25% **Projects**
25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences.
These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

Additional Course Policies

- **Assignments:** In order to receive full credit, work must be complete before the bell rings on the day it is due. Late or incomplete work is NOT accepted for full credit. If an absence is excused, students will have as many days as they were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. It the students' responsibility to organize and keep track of their assignments! Most work will be turned in as a packet at the end of a unit or electronically via email or other means.
- **Labs:** Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.
- **Lab Safety:** In case an accident occurs, report it immediately! Let the instructors decide on the proper course of action. Those not involved should clear the area.
- **Exams:** It is the student's responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following their return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.

- **Academic Integrity Policy:** Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Course Calendar

Quarter	Units of Study
1	• Safety and Career Readiness • Legal Foundations of the US Justice System • The CSI Effect • Technical Integrity of the Investigation
2	• Fiber Evidence and Analysis • Identification of Physical Evidence and Remains

- Mortality: Investigation of Various Aspects of Death
- Toxicology

3

- Science Fair
- CRJ 101: Criminal Justice Systems: Police, Courts, Corrections, Individual Rights vs. Public Order, Due Process
- CRJ 101: Criminal Justice Systems: Discretionary and Ethical Issues
- Forensic Psychology

4

- Forensic Ecology: Soil Analysis and Water Testing
- Mock Court

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI300: Forensic Science 300

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 1 **Safety and Career Readiness**	• What are the professional, industry and academic skills required in the forensic science field?	• Exhibit appropriate behavior in the lab. • Explain the dangers of evidence contamination through food, drink, cosmetics, lotion, eye drops, and contact lenses. • Use laboratory equipment correctly and safely. • Follow laboratory procedures. • Follow standard operating procedures for maintaining a lab manual. • Document laboratory work following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion).	• Ground Zero Flag Mystery Summary • American Flag Identification Lab • Uniform inspection • Goal setting and reflection journaling • Composition Lab Notebook	**Career Ready Practices** CRP 2,4,5,6,8,10,11 **Cluster Standards** HL 5 LW 5 ST 4 **Pathway Standards** HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 5 **Science** NGSSP 3 HS-ETS1-2
Weeks 2-3 **Legal Foundations of the US Justice System**	• What are the legal foundations for criminal justice in the United States? • How is the criminal justice system organized?	• Identify the constitutional rights of individuals within US Justice System. • Examine how the First Amendment relates to commercial speech and the rights of private citizens. • Explain the protections from illegal search and seizure outlined in the Fourth Amendment. • Explain the due process and equal protection clauses in the Fifth and Fourteenth Amendments. • Describe rights protected by the Ninth Amendment. • Outline the steps of the judicial process from identification of a suspect through the trial. • Explain how evidence is used to convince a jury of guilt.	• First Amendment Game • iCivics • First Amendment Cartoon • Tinker Precedent Case: Amicus Curie Legal Brief • Miranda Case Study • Forensic Professional Ethics Scenarios • Bill of Rights Posters • Court and Booking Field Trip • Court Case Reflection	**Career Ready Practices** CRP 2,4,5,6,8,10,11 **Cluster Standards** HL 5 LW 5 ST 4 **Pathway Standards** HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 5 **Science** NGSSP 3
Weeks 4-7 **The CSI Effect**	• How is forensic science portrayed in the media? • Where are the intersections of forensic science and the law?	• Evaluate the importance of a code of ethics to professional organizations. • Explain how forensic science relies on multiple disciplines to solve crimes. • Differentiate, identify and provide examples of infractions, misdemeanors, and felony crimes. • Summarize how forensic science is portrayed in literature, media and society.	• Serial Podcast Notes • Podcast/Blog Creation: Forensics Media Review of Serial/Concussion/CSI • Movie: 48 Hours: Casey Anthony Judgement Day • Summary: Casey Anthony Trial	**Career Ready Practices** CRP 2,4,6,8,10,11 **Cluster Standards** HL 1,5 LW 1, 5,6 ST 4,5,6 **Pathway Standards**	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Compare and contrast fictional detectives and modern forensic scientists. • Explain the CSI Effect and analyze how has it influenced scientific evidence in the courtroom.	• Analysis: Case Anthony Evidence • Draft Legal Argument: Casey Anthony Verdict Claim-Evidence-Reason Graphic Organizer • Mock Court: Casey Anthony	HL-BRD 6 LW-ENF 1,5,6,10 ST-SM 2,3,4	CCSM 1,2,4-6 **Science** NGSS 1,2,6,7
Weeks 8-10 **Technical Integrity of the Investigation**	• What is the value of evidence? • What procedures are implemented at a crime scene and why are they important? • What are the legal responsibilities of forensic scientists?	• Demonstrate or explain activities that occur prior to conducting a crime scene search. • Explain and demonstrate the use of constitutional law and federal rules of evidence governing search and seizure. • Explain and demonstrate appropriate search pattern methods. • Explain and demonstrate proper bagging and marking of all evidence. • Draw a crime scene sketch using proper measurements, symbols and labels. • Demonstrate proper use of measurements and conversions to draw a crime scene to scale. • Geometrically triangulate evidence. • Demonstrate how to prepare an evidence inventory. • Work together as a professional team to conduct a crime scene investigation. • Demonstrate professional bearing and demeanor. • Produce quality photographs of crime scenes including a photography log. • Simulate ethically challenging forensic scenarios. • Describe the legal and ethical responsibilities of forensic science professionals within and outside of the courtroom.	• Locard Sock Lab • Lab: Triangulate evidence • Crime Scene Reconstruction: O.J. Simpson • Movie Notes: A&E American Justice: Why O.J. Simpson Won • Analysis of forensic mistakes during O.J. Simpson trial • Skills USA Crime Scene competition practice simulation	**Career Ready Practices** CRP 2,4,8,11,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 5 LW 4,5 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,4,5,6,10,12 ST-SM 1,2,4	**Math** MP 2,3,4,5,7 **Science** NGSSP 1,2,3,4,6,7,8 HS-ETS1-2
Weeks 11-12 **Fiber Evidence and Analysis**	• How is fiber evidence from a crime scene analyzed?	• Examine and analyze the forensic aspects of fibers. • Identify and compare natural and synthetic fiber types by using physical and chemical testing methods. • Summarize systematic procedures for collection and identification of fiber evidence.	• Fluorescence Fiber Identification • Lab: Observing Refractive Index (RI) in Fibers • Lab: Light Diffraction Fiber Diameter • Lab: Fiber Burn Test • Lab: Fiber Dye Test	**Career Ready Practices** CRP 2,4,8,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** **Science** HS-PS4-1
Weeks 13-15 **Identification of Physical Evidence and Remains**	• What is forensic anthropology and what can it tell us about human remains? • What is forensic radiology?	• Identify the basic bones of the skeleton. • Use skeletal remains to determine the physical characteristics of an individual. • Determine the sex of an individual based on skull, jaw, brow ridge, pelvis, and femur. • Determine the ancestry of an individual. • Estimate the age of an individual. • Estimate the height, build, and handedness of an individual. • Identify injuries, bone diseases, and possible causes of death using bone characteristics. • Compare and contrast pre and postmortem bone injuries. • Identify bone patterns indicating disease. • Identify bone markings that could indicate cause of death.	• Lab: Who Is The Skeleton in the Closet? • Lab: One Bite Out of Crime Forensic Odontology • Lab: Bone Identification • Skeleton Foldable Notes • Bone Quiz • Skull Diagram • Lab: Estimate Age and Gender of Unknown Skeleton	**Career Ready Practices** CRP 2,4,8,10,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 1,2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2,1-3
Weeks 16-18 **Mortality: Investigation of Various Aspects of Death**	• What role do pathologists play in forensic science? • What is forensic pathology?	• Analyze the role of forensic pathologists in investigations. • Describe correct anatomical positions and the role it plays in human anatomy. • Describe anatomical position. • Apply body planes and directional terms related to the body. • Locate the body cavities, quadrants, and body regions and identify the major organs within each. • Define and list manners and methods of death. • Follow the steps of an autopsy procedure. • Determine the cause of death using evidence from an autopsy. • Identify the stages of decomposition to determine approximate time of death. • Compare and contrast algor mortis, rigor mortis, and livor mortis. • Identify common insects associated with decomposition and diagram their life cycles. • Identify various environmental factors related to time of death.	• Foldable: Body Planes and Cavities • Lab: Pickle Autopsy • Lab: Measurable You Inquiry • Movie Notes: And the Dead Shall Speak • Lab: Forensic Entomology • Lab: Body Farm Inquiry • Rwanda Genocide Case Study	**Career Ready Practices** CRP 2,4,8,10,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 1,2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2
Week 19-20		• Identify the parts of the circulatory system.		**Career Ready Practices** CRP 2,4,8,11	**ELA** 11-12R 1,2,4,7,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Toxicology	• What are the adverse effects of drugs? • How are the most common poisonings investigated?	• Identify the parts of the digestive system. • Identify the parts of the urinary system. • Compare and contrast laboratory procedures used for measuring the concentration of alcohol in the bloodstream. • Describe techniques used to measure the blood alcohol content (BAC). • Classify the five schedules of drugs according to the effects that they have on the body. • Relate the signs and symptoms of an overdose and poisoning with a specific class of drugs or toxins. • Identify chemical agents that may be used for bioterrorism. • Compare and contrast methods used to collect and package drug evidence.	• Body System Foldable Shirts • Drug Project • Public Health Campaign • Video Notes: Grim Murders in History-Poison • Making of Medicine Video		11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** CCSM 1,3,5
					Science NGSS 1,2,3,6,7,8 HS-LS1-2,1-3
Weeks 21-30 **M/W/F** **Science Fair**	• How do forensic Scientists plan and carry out investigations? • How do forensic Scientists construct explanations and design solutions?	• Create an experimental research question. • Write a hypothesis to test a research question. • Use credible sources to compile background research on a topic. • Outline and draft a background research paper. • Write a testable hypothesis statement. • Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. • Create a data table to collect quantitative and qualitative data. • Create a graph to display quantitative data. • Analyze data for patterns and trends. • Draft conclusions from data to support or abandon hypothesis and explain results. • Prepare a research presentation display board. • Present research conclusions to a public audience. • Reflect and revise work.	• Brainstorm Activity • Research Plan and Project Proposal Conference • Credible Source Pyramid and Analysis • Activity: Research Notes • Research Background Writing Outline • Science Fair Journal Reflection • Lab: Conduct Research Experiment • Collect and Display Data in Graph form • Analyze data and summarize conclusions • Project: Science Fair Display Board • Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)	**Career Ready Practice** CRP 2,4,6,7,8,11,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**Math** MP 1,2,3,4,5,6,7,8
					Science NGSSP 1,3,4,5,6,7,8 HS-ETS1-1,1-2,1-3
Weeks 21-22 **T/Th** **Police**	• How do police accomplish their goals within the framework of the	• Identify components and levels of police agencies in the U.S.	• Chapter quizzes • Chapter summaries • Current events report of the week	**Career Ready Practices** CRP 1,2,4,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
(Onondaga Community College CRJ 101 Criminal Justice Systems)	U.S. Criminal Justice system?	• Describe state, federal, and local law enforcement agencies and their interaction with each other. • Explain the role of police in the initial response and throughout the criminal justice process. • Describe the history of policing in the U.S., and consider the role of police departments in a democracy. • Survey duties assigned to local, state and federal law enforcement agencies. • Assess the role of private law enforcement agencies.	• Crime Cause Analysis Research Essay	**Cluster Standards** LW 4 **Pathway Standards** LW-ENF 1,5	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science**
Weeks 23-24 **T/Th** **Courts** **(OCC CRJ 101)**	• What levels of courts exist in the U.S. Criminal Justice system? • What roles exist in each level of the court system?	• Explain the right of due process and the sixth amendment to the U.S. Constitution. • Describe how the courts in the U.S. Criminal Justice System work as a check and balance for our government. • Explain the function of interpreting laws for the courts and give examples of it. • Describe how the courts shape the laws.	• Chapter quizzes • Chapter summaries • Current events report of the week • Mock Court Trial	**Career Ready Practices** CRP 1,2,4,12 **Cluster Standards** LW 4 **Pathway Standards** LW-ENF 1,5	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science**
Weeks 25-26 **T/Th** **Corrections** **(OCC CRJ 101)**	• What is a jail? • What is prison? • What are probation and parole? • How does corrections support police and courts in the Criminal Justice system?	• Identify levels of corrections in the U.S. Criminal Justice system. • Describe prison culture. • Describe recidivism and statistics that help shape sentencing. • Describe the similarities and differences between probation and parole.	• Chapter quizzes • Chapter summaries • Current events report of the week	**Career Ready Practices** CRP 1,2,4,12 **Cluster Standards** LW 4 **Pathway Standards** LW-ENF 1,5	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science**
Weeks 27-28 **T/Th** **Individual rights vs Public Order** **(OCC CRJ 101)**	• What is meant by the "Scales of Justice"? • How does the Criminal Justice system keep individual rights and	• Describe how justice and equality apply to the Criminal Justice System. • Identify the decisions that have shaped how we balance rights and order. • Explain the Posse Comitatus Act.	• Chapter quizzes • Chapter summaries • Current events report of the week	**Career Ready Practices** CRP 1,2,4,12 **Cluster Standards** LW 4 **Pathway Standards**	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
	public order in balance?			LW-ENF 1,5	
					Science
Weeks 29-30 **T/Th** **Due Process** **(OCC CRJ 101)**	• What laws and constitutional amendments guarantee due process? • How does due process affect police, courts, and corrections as pillars of the criminal Justice system?	• Describe the roles of each pillar in due process. • Explain individual, police, and victim rights in due process. • Identify the cases in U.S. history that have addressed due process and the results of those cases.	• Chapter quizzes • Chapter summaries • Current events report of the week	**Career Ready Practices** CRP 1,2,4,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards LW 4	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards LW-ENF 1,5	**Math**
					Science
Weeks 31-32 **T/Th** **Discretionary and Ethical Issues** **(OCC CRJ 101)**	What are discretionary issues in the Criminal Justice system? What are ethical issues in the Criminal Justice system?	• Identify different discretionary and ethical issues as it relates to law enforcement. • Describe the effects of ethical precedents on today's criminal justice system. • Explain the significance of ethics and professionalism in policing. • Investigate legal issues surrounding the use of force, search and seizure, police corruption and racial profiling.	• Chapter quizzes • Chapter summaries • Current events report of the week • Evidence in Uses of Police Force Cases (Michael Brown, etc.) • Case Studies: Legal Precedents in Contemporary Police Brutality Criminal Investigations • NY Times Student Op-Ed Competition	**Career Ready Practices** CRP 1,2,4,12	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards LW 4	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards LW-ENF 1,5	**Math**
					Science
Weeks 31-34 **M/W/F** **Forensic Psychology**	• How are criminals profiled?	• Locate and identify the major organs of the nervous system. • Describe the importance of the role of membranes in the nervous system. • Identify the three layers of meninges. • Identify the three types of hemorrhage involving the meninges. • Identify and describe offender-profiling procedures. • Identify psychological testing processes and procedures used to study the criminal mind. • Explain the problems with psychometric tests. • Describe brain abnormalities, genetics, and environmental factors related to the criminal mind.	• Notes: Brain Anatomy and Nervous System • Interview a forensic professional • Sibling Rivalry • Drive-By Shooting • Notes: Profiling Process Stages • Case Study: New York's Mad Bomber • Serial Killer Research	**Career Ready Practices** CRP 2,4,8,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** MP 1,3,5
					Science NGSSP 1,2,3,6,7,8 HS-PS4-5,4-6 HS-LS1-2,1-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Describe the physiological functions measured by a polygraph machine. • Interpret data collected from a polygraph. • Explore the psychological aspects of a serial killer.			
Weeks 35-39 **M/W/F** **Forensic Ecology: Soil Analysis and Water Testing**	• How are soil and water samples tested?	• Describe the distinguishing characteristics of and compositions of different soils. • Compare and contrast the different soil layers found in a soil profile. • Analyze soils using macroscopic and microscopic examination, as well as physical and chemical testing. • Describe the effects of different physical and chemical compositions of soils on the decomposition of a corpse. • Test water samples for the presence of chemicals.	• Soil Evidence Examination • Chemical and Physical Analysis of Sand • Article: Lead Pipes in Flint • Lead Testing Inquiry • Guest Speaker	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1-3,5 **Science** NGSS 1,2,3,6,7,8 HS-ESS 2-3,3-4
Week 40 **Mock Court**	• What are the main learning goals for this past year in forensic science?	• Work as a member of team. • Work in cross-curricular groups. • Compile accomplishments in a resume. • Write a cover letter. • Explore and identify various fields of expertise in forensic science. • Research the different education and training requirements for the various careers in forensic science.	• Mock Court • Practical Exam: Crime Scene Scenario • Portfolio: Resume, Cover Letter • Presentation • Interview of professional working in the field of forensic science	**Career Ready Practices** CRP 2,4,6,7,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,4,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science**

Syracuse City School District
Career and Technical Education Program
Course Syllabus
CSI400: Forensic Science 400 (SUPA Forensic Chemistry)

Program Overview

Forensic Science is the application of scientific methods and techniques to gather and examine information which is used in a court of law. This program is a lab-based, hands-on course that will explore the work of forensic scientists. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. Students will learn how forensic scientists collect and document physical evidence, conduct laboratory analysis, and present results during testimony in a court of law. Laboratory exercises will include learning techniques commonly employed in forensic investigations. The program will examine actual case histories of crimes and requires students to apply basic understandings of physics, chemistry, biology, psychiatry, math, and more to reveal the whole story of a crime. Students who successfully complete the Forensic Science program will be prepared to excel in a two- or four-year post-secondary Criminal Justice or Forensics program.

Course Description

This is the culminating course in the Forensic Science pathway. This course provides an in-depth exploration of analytical tools used in the forensic sciences. As part of this course, students will be enrolled in Syracuse University Forensic Chemistry 113. Students will also create and conduct an independent research project for the Science Fair. Students will continue to develop their knowledge and skills as they learn more advanced crime scene investigation techniques, including microscopy, DNA, blood spatter and fingerprint analysis, entomological and soil evidence analysis, and the analysis of glass, firearms and computer/digital evidence Students will explore. Students will also investigate the areas of forensic anthropology, spectroscopy, fire and arson investigation, and behavioral sciences in crime investigation. Students will focus on completing the pathway and exploring opportunities for post-secondary education, training and/or employment.

Work-Based Learning

Students will be connected with professionals in the forensic science field through field trips, job shadowing and Career Coaching, leading to opportunities for direct job training and real-world experience. Students will create and maintain a portfolio of their experiences to document the development of their skills, including a professional resume.

Pre-Requisites

CS 100: Forensic Science 100, CSI200: Forensic Science 200, and CSI300: Forensic Science 300

Course Objectives

Students will

1. Explain the professional, legal, and ethical responsibilities of forensic science professionals.
2. Document and process evidence from a crime scene.
3. Perform comparative analysis on a wide variety of forensic evidence.
4. Engage in argument from evidence.
5. Explain the role that forensic anthropologists and behavioral scientists play in forensic science.
6. Plan and carry out an independent research project.
7. Create a plan for post-secondary education and/or employment.

Integrated Academics

1 CTE Integrated ELA Credit

Concurrent Enrollment College Credit

Upon successful completion of Forensic Science 400, students will earn 4 college credits for Forensic Chemistry 113 from Syracuse University

Equipment and Supplies

- **School will provide:** Textbook, laptop and all lab materials
- **Student will provide:** 3-ring binder, composition lab book, notebook paper, pencil, pen, earbuds or headphones

Textbook

Brown, R., & Davenport, J. (2016). *Forensic Science: Advanced Investigations.* Boston, MA: Cengage Learning.
Saferstein, R. (2014). *Criminalistics: An Introduction to Forensic Science, 11th Edition.* New York: Pearson.
Spencer, J. T. (2012). *Introduction to Forensic Science: The Science of Criminalistics.* Boston, MA: Cengage Learning.

Grading

25% **Tests and Quizzes:** Tests include all summative assessments (written exams, projects, authentic products, presentations, etc.) Quizzes will cover the most recent material and review of important concepts.
25% **Labs:** Labs are often performed in groups of 2-4 students. ALL lab work will be collected and curated in a composition notebook. Lab reports will require group collaboration and individual work and some formal lab reports will be typed.
25% **Projects**
25% **Classwork:** Most work will be completed in class. Homework will mainly consist of work from absences
These percentages are estimates, and subject to change based on the nature of the students involved and the class itself.

Additional Course Policies

- **Assignments:** In order to receive full credit, work must be complete before the bell rings on the day it is due. Late or incomplete work is NOT accepted for full credit. If an absence is excused, students will have as many days as they were absent to make up missed work. Absences make it very difficult to keep up with the coursework. Some work may not be possible to make-up due to the nature of activity (bellringers, labs, class discussions, etc.). See teacher with questions. It is the students' responsibility to organize and keep track of their assignments! Most work will be turned in as a packet at the end of a unit or electronically via email or other means.
- **Labs:** Most lab work will be collected in a composition notebook. Labs will be performed in groups. Lab reports will require group collaboration and will require use of computer technology.
- **Lab Safety:** In case an accident occurs, report it immediately! Do not try to hide anything out of embarrassment - you will be making the situation worse, endangering yourself and others. Let the instructors decide on the proper course of action. Those not involved should clear the area.
- **Exams:** It is the student's responsibility to schedule with the teacher to make up a missed test/quiz for any excused absence within the week following their return. Students with an unexcused absence on the day of an exam will NOT be able to make up the exam or quiz. Students may retake quizzes if they show completed homework. Quiz and test dates will be announced 2 days and 5 days in advance, respectively.
- **Academic Integrity Policy:** Students are expected to behave ethically and with integrity. Academic dishonesty (including letting others copy) will result in no credit for the assignment and may include a meeting between the student, parent/guardian and an administrator. Please refer to school policies for more information on this policy. Please give help and hints, but not answers.

Course Calendar

Quarter	Units of Study
1	• Success in SUPA Forensic Chemistry • Evidence in the Legal System • Crime Scene Investigation • Science, Pseudoscience and Statistics • Microscopy and Methods in Examining Biological Evidence
2	• DNA Analysis • Serology: Blood Spatter • Anatomical Evidence: Fingerprints
3	• Careers in Forensic Medicine • Science Fair • Entomology and Soil in Death Investigation • Forensic Anthropology
4	• Chemical Evidence and Forensic Spectroscopy • Explosives and Arson Investigation • Physical Analysis of Glass • Firearms and Ballistics

	• Forensic Engineering and Computer Forensics • Behavioral Social Sciences: Psychology and Sociology • Portfolio Presentation

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
CSI400: Forensic Science 400 (SUPA Forensic Chemistry)

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 1 **Success in SUPA Forensic Chemistry**	• What are the expectations of a college course? • How can students prepare for success? • What are the professional, industry, and academic skills required in the forensic science field?	• Describe study skills and strategies that support academic success. • Explain the mindset, qualities and skills required for success in Forensic Science. • Describe the challenges and benefits of eyewitness evidence. • Present a personal action plan for success. • Demonstrate safe practices in labs and field investigations. • Write a claim and support with evidence. • Exhibit appropriate behavior in the lab. • Perform the steps of laboratory protocols accurately and in sequence. • Follow standard operating procedures for maintaining a lab manual following the steps of the scientific method (objectives, material, procedures, data/results, and conclusion).	• SUPA Registration • Article: Active Learning Strategies • Presentation: Active Learning Strategies Poster Teach Back • Lab: Safety • Anticipation Guide: Eyewitness Myths • Video: Frontline-What Jennifer Saw • Blog Reflection: Eyewitness Evidence • Uniform inspection	**Career Ready Practices** CRP 2,4,5,6,8,10,11 **Cluster Standards** HL 5 LW 5 ST 4 **Pathway Standards** HL-BRD 6 LW-ENF 1,5,6 ST-SM 3,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 5 **Science** NGSSP 3
Week 2 **Evidence in the Legal System**	• What are the professional legal and ethical responsibilities of forensic scientists?	• Describe what is meant by the terms forensic science and criminalistics. • Explain the difference between a basic and an applied science. • Explain the relationship between the law, basic science and applied science. • Define Locard's Exchange Principle. • Explain how fiction contributed to the development of forensics science. • Describe the features that fictional detectives and modern forensics scientists have in common. • Define the CSI Effect and how it has influenced scientific evidence in the courtroom. • Describe the Principle of Individuality. • Explain how precedent cases pave the way for scientific evidence in the courtroom. • Explain the key features of the Frye and Daubert cases. • Explain how the Joiner, Khumo and Melendez-Dias cases affect expert testimony.	• Lab: Anthropometry • POGIL (Process Oriented Guided Inquiry): Historic Development of Forensic Science • Debate: New Jersey v. T.L.O. • Quiz 1: Ch. 1 • Reading Questions: JTS Ch. 1 • Ch. 1 Presentations • Notes: Forensic Scientist Legal Responsibilities	**Career Ready Practices** CRP 2,4,6,8,10,11 **Cluster Standards** HL 1,5 LW 1,5,6 ST 4,5,6 **Pathway Standards** HL-BRD 6 LW-ENF 1,5,6,10 ST-SM 2,3,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1,2,4-6 **Science** NGSS 1,2,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Week 3-4 **Crime Scene Investigation**	• How is a crime scene processed? • What procedures are implemented at a crime scene and why are they important? • How is evidence collected and analyzed?	• Explain when evidence is admissible in court and what circumstances might render it inadmissible. • Describe the difference between class and individual characteristics. • Describe what types of comparison analyses can be done and when they are used. • Explain what is meant by probative and prejudicial evidence. • Describe and dramatize search patterns. • Identify the steps taken during the beginning of a crime scene investigation, and all the way through the investigation itself. • Conduct a systematic search of a mock crime scene. • List the details of each the jobs assigned during a crime scene investigation, and apply those skills to a model. • Recognize the importance of the use of chain of custody and search warrants.	• Lab: Scavenger Hunt • Debate: New Jersey v. T.L.O. • Reading Questions: JTS Ch. 2 • Activity: Crime Scene Search Patterns • Activity: Crime Scene Reconstruction • Intro 1 Exam: Ch. 1 and 2. • Digital (Sketch Up) or Physical (Doll House) Crime Scene Reconstruction	**Career Ready Practices** CRP 2,4,6,8,10,11 **Cluster Standards** HL 1,5 LW 1,5,6 ST 4,5,6 **Pathway Standards** HL-BRD 6 LW-ENF 1,5,6,10 ST-SM 2,3,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1,2,4-6 **Science** NGSS 1,2,6,7 HS-ETS1-2
Weeks 5-7 **Science, Pseudoscience and Statistics**	• What is science? • What is pseudoscience? • How can scientific methods help solve problems? • How are statistics and probability used in forensic science? • How do we estimate the reliability of measurements?	• Accurately measure and express precise measurements with correct units. • Explain the difference between accuracy and precision of measurements. • Convert between units. • Explain the SI system of measurement and how it works. • Calculate the uncertainty of a measurement using mean, median, mode, standard deviation and probability. • Describe what is meant by pseudoscience and how it can be identified. • Explain what is meant by probability and statistics. • Discus how ethics are important in forensics science. • Calculate probabilities of class evidence. • Analyze, evaluate and critique scientific explanations by using data, logical reasoning, and observations. • Identify the components necessary for 'real' science. • Perform basic statistical analyses.	• Science vs Pseudoscience Mini-Video • Accuracy, Percent Error, Reliability • Metric System Notes • Dimensional Analysis Notes • POGIL: Science vs Pseudo-Science • Lab: Standard Deviation of M&M Bags • Lab: M&M Statistics • Lab: Statistical Analysis • Lab: Building a Lie Detector • Notes: SU Forensic Chemistry Professor Guest Speaker • Reading Questions: JTS Chapter 3 • Product Testing • Observation Experimental Design • Commercial Presentation	**Career Ready Practices** CRP 2,4,5,8,11 **Cluster Standards** HL 1, LW 2,4,5 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,4,5,6,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 1,2,3,4 **Science** NGSS 3,4,5
Week 8-10				**Career Ready Practice**	**ELA**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Microscopy and Methods in Examining Evidence	• How do scientists accurately observe and measure evidence? • How does crime scene photography differ from regular photography? • How can a photographic record that could be used in court be produced?	• Describe electromagnetic radiation and how we perceive it. • Explain how a lens works to create a magnified image. • Describe the basic principles of microscope operation. • Explain and use resolution, magnification, and aperture. • Describe types of microscopy and when they are used. • Demonstrate proper use and handling of a compound microscope and a stereoscope. • Produce quality photographs of crime scenes including a photography log.	• Lab: Microscope • Notes: Microscopy • Reading Questions: JTS, Ch. 4 • Intro 2 Exam: Ch. 3 and 4 • Digital Reconstruction (Sketch Up) • Evidence Photography • Reading and Questions on Forensic Photography • Presentation of crime scene photos using iMovie	CRP 2,8,11,12 **Cluster Standards** HL 1 LW 2,4,5 ST 1,2,6 **Pathway Standards** HL-BRD LW-ENF 1,5 ST-SM 1,2,4	11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science** NGSSP 1,2,3,7,8 HS-PS4-5,4-6
Week 11-14 **DNA Analysis**	• What are the structure of DNA? • What are the forensic applications of DNA? • How does mitochondrial DNA and Y chromosomal typing work? • What are DNA databanks and how are they used in forensic science?	• Describe how crime-scene evidence is processed to obtain DNA. • Demonstrate how to package, collect, and analyze DNA from a crime scene. • Diagram the DNA molecule. • Describe the chemical structure of DNA and how it holds genetic information. • Compare and contrast genes, chromosomes, introns and exons. • Explain what a short tandem repeat (STR) is, and explain its importance to DNA profiling. • Explain how law-enforcement agencies compare new DNA evidence to existing DNA evidence. • Describe the use of DNA profiling using mtDNA and Y STRs to help identify a person using the DNA of family members. • Identify the difference between variable number tandem repeats (VNTR) and short tandem repeats (STR). • Explain how the Restriction Fragment Length Polymorphism (RFLP) method works. • Follow polymerase chain reaction laboratory procedures. • Explain how frequency of occurrences of STRs in populations is determined and used. • Explain how mitochondrial DNA can be used in forensic investigations.	• DNA Extraction • POGIL: DNA • Reading Questions: JTS Ch 5 • DNA Profiling Interactive • Restriction Enyzme ID • Lab: Crime Scene DNA PCR • Paper PCR • PCR- Lewinsky/Clinton Scandal Activity • Rape Case Study • Romanov Family Case Study	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,3,4 LW-ENF 1,5,6,10,12 ST-SM 2	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 2, 3, 4, 5, 7 **Science** NGSSP 1,2,3,4,6,7,8 HS-LS1-1,3-1,3-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Calculate the random match probability (RMP) of a genetic profile. • Describe how combined DNA Index Systems (CODIS) is used in criminal investigations.			
Week 15-17 **Serology: Blood Spatter**	• What is serology and how is it used to solve crimes? • How is blood identified at a crime scene? • How are blood patterns analyzed?	• Analyze stains to determine the presence of blood. • Interpret events through blood pattern analysis. • Analyze bloodstain patterns based on source, direction, and angle of trajectory. • Compare and contrast low, medium, and high velocity blood spatter. • Identify types of blood transfer patterns. • Identify different types of blood spatter patterns (drop, castoff, transfer, swipe, spurt, expirated). • Properly perform and explain a presumptive blood test (Kastle-Meyer). • Preserve blood evidence according to proper procedures.	• Movie: 48 Hours-Doctor's Daughter • Lab: Blood Spatter • Motion and Angle of Impact Experiments • Dr. Neulander Case Blood Spatter • Detection of Blood • Weapon Inquiry	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1,3 LW 3,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 2,3,4,5,7 **Science** NGSSP 1,2,3,4,6,7,8 HS-PS 2-3
Week 18-20 **Anatomical Evidence: Fingerprints**	• How is fingerprint evidence analyzed in a crime scene?	• Describe the structure of friction skin: sweat pore, sweat pore duct, sweat gland, papillae, dermis, epidermis, friction ridge. • Describe fingerprint classification. • Describe the three fundamental principles of fingerprinting (first, second, and third principles). • Compare and contrast latent, plastic, and visible fingerprints. • Demonstrate how fingerprint evidence is collected and select appropriate techniques for the development of latent prints on various surfaces. • Develop latent fingerprints using dusting, staining, and chemical fuming. • Develop a plastic fingerprint using a mold. • Calculate TRC (Total Ridge Count). • Compare and contrast lab methods to develop fingerprints. • Use digital photography to compare and analyze fingerprints. • Describe the function of IAFIS (Integrated Automated Fingerprint Identification System).	• Lab: Fingerprints • Fiber Microscopy • Fiber Burn Testing • Reading Questions: JTS Ch 7 • Activity: Chemical Reactions Demonstration • *Extension:* Op-Ed: Debunk FBI Hair Forensics • Lab: Fingerprint TRC Statistics • Lab: Fingerprinting Methods • Iodine Fuming Demonstration • Ninhydrin Development • Superglue Fuming • Acidified Hydrogen Peroxide Brass Cartridge Cases • Demonstration: Latent Fingerprint Visualization Methods	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Utilize the primary classification (the Henry System) "fraction" calculations. • Analyze the pores and spots between the friction ridges using tertiary classification. • Explain the ACEV (analysis, comparison, evaluation and verification) method to reach a determination on each print. • Utilize ALS (alternate light source) to identify a print. • Create and document visible fingerprints using digital photographs. • Explain the limitations and strengths of biometric information.			
Week 21-22 **Careers in Forensic Medicine**	• What is forensic pathology? • What are the medical careers path in forensics?	• Analyze the role of forensic pathologists and anthropologists in investigations. • Explain the processes and timelines of human death and decomposition. • Describe the role of mitochondrial DNA in bone identification. • Describe the aspects of medicine are involved in a medicolegal practice. • Explain the duties and training for coroners and medical examiners. • Interpret manner of death, cause of death, and mechanism of death. • Describe and apply the classifications for manner of death. • Perform a digital autopsy. • Investigate the major systems of the body. • Characterize the major types of trauma.	• Lab: Anthropometry • Reading Question: JTS Ch 8 • Video Autopsy • WEBQUEST-Virtual Autopsy • Life Masks: Biometrics of the Face • POGIL: Human Forensic Anatomy • And the Dead Shall Speak story, video, interview • Interview of professional working in the field of forensic science • Lab: Body Farm Inquiry • Case Studies: Claude Snow, Grave at Vukovar, Billy the Kid	**Career Ready Practices** CRP 2,4,8,10,11 **Cluster Standards** HL 1 LW 1,2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2
Weeks 23-26 **Science Fair**	• How do forensic scientists plan and carry out investigations? • How do forensic scientists construct explanations and design solutions?	• Create an experimental research question. • Write a hypothesis to test a research question. • Use credible sources to compile background research on a topic. • Outline and draft a background research paper. • Write a testable hypothesis statement. • Construct an experimental design (with the independent, dependent, and control variables) to test a hypothesis. • Create a data table to collect quantitative and qualitative data. • Create a graph to display quantitative data. • Analyze data for patterns and trends.	• Brainstorm Activity • Research Plan and Project Proposal Conference • Credible Source Pyramid and Analysis • Activity: Research Notes • Research Background Writing Outline • Science Fair Journal Reflection • Lab: Conduct Research Experiment • Collect and Display Data in Graph form	**Career Ready Practice** CRP 2,4,6,7,8,11,12 **Cluster Standards** HL 1,2,3 LW 1,3,5,6 ST 2,3,4,5,6 **Pathway Standards** HL-BRD 1,6 LW-ENF 1,4,5,6,12 ST-SM 3	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 1,2,3,4,5,6,7,8 **Science** NGSSP 1,3,4,5,6,7,8 HS-ETS1-1,1-2,1-3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Draft conclusions from data to support or abandon hypothesis and explain results. • Prepare a research presentation display board. • Present research conclusions to a public audience. • Reflect and revise work.	• Analyze data and summarize conclusions • Project: Science Fair Display Board • Science Fair Poster Presentation (PSLA Science Fair, CTE Expo, MoST Science Fair)		
Weeks 27-28 **Entomology and Soil in Death Investigation**	• How is the time of death determined? • What are the different fields of forensic ecology? • What are different methods of chemical analysis?	• Analyze physical and chemical properties of evidence collected from a crime scene. • Identify flies, maggots and pupa that visit a dead body. • Describe the insect life cycle. • Describe the make-up of soil. • Describe how soil affects the decomposition of dead bodies. • Conduct assay phosphate concentrations in soil specimens. • Identify the spectroscopic characteristics of soil. • Extract ion species from a soil sample. • Use spectrometer to analyze samples.	• POGIL: Maggots to Murder • Forensic Entomology Notes • Lab: Anthropology • Lab: Entomology and Crime Solving Insects • Lab: Physical Characteristics of Soil-Soil Density, Settling Time, Particle Size Distribution • Microscopic Characteristics of Soil • Lab: Assay • Reading Questions: JTS, Chapter 9	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** **Science** HS-LS2-6
Weeks 29-30 **Forensic Anthropology**	• What is forensic anthropology and what can it tell us about human remains? • What role do anthropologists play in forensic science? • What is forensic radiology?	• Determine if an object is bone or not. • Identify a bone as human. • Determine the age of a bone. • Construct a biological profile from skeletal remains. • Prepare a facial reconstruction from a skull. • How to gain insight into how someone died by examining their bones. • Process a crime scene containing bones. • Analyze the role of forensic anthropologists in investigations. • Identify career-related information that is relative to making career decisions. • Review the major bones of the human skeletal system. • Compare the composition and structure of human and animal bones. • Describe the techniques used to excavate bones. • Determine the unique characteristic of an individual (e.g. age, gender, race, and height) from their bones.	• POGIL: Skulls, Hips and Femurs • Reading Questions: JTS Ch. 10 • Lab: Measurable You Inquiry • Interview of professional working in the field of forensic science • Bone Quiz • Lab: Who Is The Skeleton in the Closet? • Lab: One Bite Out of Crime Forensic Odontology • Lab: Talking Bones	**Career Ready Practices** CRP 2,4,8,10,11 **Cluster Standards** HL 1 LW 1,2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** MP 1,3,5 **Science** NGSSP 1,2,3,6,7,8 HS-LS1-2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Explain the processes and timelines of human death and decomposition. • Describe how bone is formed. • Distinguish between male and female skeletal remains based on skull, jaw, brow ridges, pelvis, and femur. • Describe how bones contain a record of injuries and disease. • Describe how a person's approximate age could be determined by examining his or her bones. • Explain the differences in facial structures among different races. • Describe the role of mitochondrial DNA in bone identification.			
Weeks 31-32 **Chemical Evidence and Forensic Spectroscopy**	• How is chemical evidence analyzed? • How can paint chips be observed, compared, and used to prove ownership?	• Use chromatography to separate mixtures. • Use classical analytical chemistry methods. • Use gravimetric and volumetric analysis. • Identify the different components of automobile paint. • Characterize the microscopic examination of paint. • List and define the techniques used in paint comparisons. • Explain how to properly collect and preserve paint evidence. • Perform gas chromatography (GC) spectrum analysis.	• Reading Questions: JTS Ch. 11 • Lab: Chromatography • Lab: Spectroscopy • POGIL: Spectroscopy and Chromatography • Reading Questions: JTS Chapter 12 • Lab: Paint Layer Determination	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1,3,5 **Science** NGSS 1,2,3,6,7,8 HS-PS1-1,8,10,2-6
Weeks 34 **Explosives and Arson Investigation**	How is arson investigated?	• Define fire. • Define the fire tetrahedron. • Explain the four types of fires and give examples. • Describe the chemical components of fire. • State the information that smoke from a fire provides. • State the information that the colors of fire provide. • Describe the parts of a fire investigation. • Explain the importance of the determination of the point of origin and give examples of different burn patterns: chimney effect, v patterns, char patterns, heat shadows. • Identify and state the characteristics of different accelerants. • Define arson.	• Reading Questions: JTS Chapter 14 • Explosives/Arson: The Nightclub Fires of 2002 • 911 • NOVA: The Serial Arsonist • Death by Fire Case Study • Reading: Oklahoma City Bombing • Guest Speaker: Onondaga County Arson Investigator • World Trade Center Bombing	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1,3,5 **Science** NGSS 1,2,3,6,7,8 HS-PS1-5,1-6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Identify signs of arson. • Give examples of the primary motives for arson. • Outline the systemic process of an arson investigation. • Describe the process of collection and preservation of arson evidence. • Explain the difference between fire and explosions. • Identify common explosives. • Identify explosives in a laboratory. • Compare the different types of explosives: primary explosives, low explosives, high explosives. • Describe the role of forensic science in relation to terrorism and homeland security.			
Weeks 35 **Physical Analysis of Glass**	• How do crime scene investigators examine glass?	• Measure density and viscosity. • Determine refractive index and birefringence. • Explain the formation of color, color perception in additive and subtractive methods. • Calculate the direction of a projectile by examining glass fractures. • Compare the composition of glass fragments. • Describe the electromagnetic spectrum and light characteristic including waves, wavelength, frequency, and speed. • Explain and utilize scientific technology, including various microscopes, types of lasers, and the spectrophotometer, that apply the properties of light to investigate trace evidence. • Determine the identity of trace evidence by applying scientific theories of light.	• Reading Questions: Chapter 15 • Forensic Glass Analysis Experiment • Density Phenomenon Beads • Density of Glass: The Flotation Method • Density: Displacement • Density Inquiry • Forensic Glass Quiz and Exam • Lab: Refractive Index (RI) of Glass by Submersion • Observe and Compare Glass Shards	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards** HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math** CCSM 1-3,5 **Science** NGSS 1,2,3,6,7,8 HS-PS1-1
Weeks 36 **Firearms and Ballistics**	• How do crime scene investigators examine tool mark impressions, bullet fragments, and bullet holes?	• Explain the individual characteristics of tool marks. • Recognize characteristics of bullet and cartridge cases. • Explain laboratory methodologies used to determine whether an individual has fired a weapon, such as identifying gunshot residue.	• Toolmark Analysis Experiment • Lab: Marshmallow Shooters Trajectory • Firearms and Tool Marks Examination • Fire Arms ID certification • Lab: Lands and Grooves	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** HL 1 LW 2,4 ST 2,6 **Pathway Standards**	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6 **Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7 **Math**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
		• Recognize the type of information available through the National Integrated Ballistics Information Network. • Summarize Goddard and Sacco Vanzetti case issues. • Describe the caliber, gauge, mm measurements, firing pin markings, cartridge propellants, structure of cartridge and contents to analyze the origin of a bullet or casing. • Describe difference among firearm types. • Categorize the lands and grooves on a shell casing.	• Case Study: JFK, Oscar Pistorius • Frontline: Ring of Fire- The Crisis of American Made Handguns • Ballistics NOVA: Who Shot JFK?	HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	CCSM 1,2,3,5 **Science** NGSS 1,2,3,6,7,8
Week 37 **Forensic Engineering and Computer Forensics**	• What is the role of digital evidence in forensic Investigations today? • How are digital documents analyzed?	• Explain the role of the FBI, CIA, NSA and Office of Homeland Security in 21st Century. • Describe the process of security encryption. • Describe the process of identifying and securing digital evidence. • Analyze digital evidence.	• Reading Questions: JTS Chapter 18 • NOVA: Decoding Nazi Secrets • NOVA: Decoding Enigma • 9/11 WTC Tower Collapse • Lab: Tower Building • Lab: Bridge Failure Forensic Analysis	**Career Ready Practices** CRP 2,4,8,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** CCSM 1,2,3,5 **Science** NGSS 1,2,3,6,7,8 HS-PS4-2
Week 38-39 **Behavioral Social Sciences: Psychology and Sociology**	• What is criminal psychology and what does it tell us about criminal behavior? • Can we create a profile of a criminal/ serial killer?	• List the key contributor to and their work in the field of criminal profiling. • Explain the stages of the criminal profiling process. • Differentiate between the roles of the investigator and the profiler. • Compare and contrast an interview and an interrogation. • Describe the cognitive approach for interviewing. • Describe special considerations for interviewing children. • Differentiate between the five common models of interrogation. • Explain the importance of objectivity in report writing.	• Analysis of Serial Killers • Fakebook Criminal Laboratory	**Career Ready Practices** CRP 2,4,8,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7 11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,10,12 ST-SM 1,2,4	**Math** **Science**
Week 40	• What are the main learning goals for this		• Crime Scene Simulations • Crime Scene Reports	**Career Ready Practices** CRP 2,4,6,7,8,11	**ELA** 11-12R 1,2,4,7,8,9 11-12W 1,2,5,6,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	CCTC Standards	NYS Standards
Portfolio Presentation	past year in forensic science?	• Complete the CTE assessment demonstrating a though knowledge of forensic science. • Work as a member of team. • Work in cross-curricular groups. • Compile accomplishments in a resume. • Write a cover letter. • Explore and identify various fields of expertise in forensic science. • Research the different education and training requirements for the various careers in forensic science.	• Develop a FS Career/Education recruiting presentation: college entrance requirements, etc. • Pathbrite Portfolios • Resumes		11-12SL 1,2,3,4,5,6 11-12L 1,2,3,4,5,6
				Cluster Standards HL 1 LW 2,4 ST 2,6	**Literacy** 11-12RST 1,2,3,4,5,6,7,8 11-12WHST 1,2,4,5,6,7
				Pathway Standards HL-BRD 2,4 LW-ENF 1,4,10,12 ST-SM 1,2,4	**Math**
					Science