Honors Forensics Science



**The information contained in this class syllabus may be subject to change**

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| **North Mecklenburg High School**  **(Honors Forensic Science Course Syllabus)** |
| 11201 Old Statesville Rd, Huntersville, NC 28078  **PHONE:**980-343-3840 |
| **Course Instructor** |
| **Instructor:** Codey Hilton **Room:** J202  **Email**:codeyd.hilton@cms.k12.nc.us **Website:** [**Mr. Hilton's Science Site**](http://www.codeyhilton.weebly.com/) **www.codeyhilton.wwebly.com**  **Tutoring Hours – Immediately following school every day. Other times available by appointment** |
| **Course Description** |
| Forensics is a (1 credit) elective course designed to engage students using a creative, problem solving and inquiry based approach. This course will incorporate multidisciplinary instruction using topics from biology, chemistry, physics, and earth sciences.  Included will be topics linked to social studies, in particular a glance into law and criminalistics, in addition to math. Students will apply their knowledge in these topics under laboratory supervision and throughout the process of solving forensics based cases. |
| **Enduring Understanding for the Course** |
| One of the most important tools for forensic investigation is observation and interpretation of evidence without placing prior judgment. Proper observation, analysis, collection, recording, and processing of evidence is what will set a suspect free or place them into custody. Scientific evidence when gathered, processed, and interpreted correctly, does not lie and holds true in a court of law. |
| **Course Requirements/Supplies** |
| 1 composition notebook  1 writing utensil  1 box of fitting gloves  1 Roll of tape  1 ream of copy/printer |
| **Class Attendance and Tardy Policy** |
| It is expected that you will attend class daily to maximize your experience with the course. In the event of an excused absence, you are expected to comply with CMS’s make up work policy so that it doesn’t impact your grade. |
| **Classroom Rules for Conduct** |

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| 1. Follow directions the first time  2. Come to class on time and prepared  3. Use respectful language  4. Keep hands, feet, and objects to yourself  5. Remain seated unless otherwise instructed  6. Use electronics during time allotted only  The information and dates contained in this class syllabus maybe subject to change. | |
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| **General Course Outline & Sequence** | |
| **Unit**  **Unit** | **Objectives**  **Activities** |
| I. Crime Scene Analysis | •HS-FS-CSA-1 Students will summarize Locard’s exchange principle.  •HS-FS-CSA-2a Students will explain how to approach the initial investigation of a crime scene.  •HS-FS-CSA-2b Students will describe how to identify primary and secondary crime scenes and evidence.  •HS-FS-CSA-2c Students will understand how to identify, preserve, and document evidence.  •HS-FS-CSA-2d Students will construct a diagram and reconstruct a crime scene. |

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| 2. Forensic Pathology | •HS-FS-FPa-1a Students will describe how and why the dead body of a victim contains an abundance of evidence that can be used to identify the mechanism of death.  \*HS-FS-FPa-1b Students will assess how Entomological evidence can be used to determine time of death. |
| 3. Forensic Anthropology | •HS-FS-FA-1a Students will describe how bone is formed.  •HS-FS-FA-1b Students will distinguish between male and female skeletal remains.  •HS-FS-FA-1c Students will describe how bones contain a record of injuries and disease.  •HS-FS-FA-1d Students will describe how a person’s appropriate personal characteristics (age, height, and race) could be determined by examining his or her bones.  •HS-FS-FA-1e Students will describe the role of mitochondrial DNA in bone identification. |
| 4. Hair and Fiber Analysis | •HS-FS-HF-1a Students will identify the various parts of a hair.  •HS-FS-HF-1b Students will describe the variations in the structure of the medulla, cortex and cuticle.  •HS-FS-HF-1c Students will distinguish between human and nonhuman animal hair.  •HS-FS-HF-1d Students will distinguish between hair between individuals and ethnicities.  •HS-FS-HF-1e Students will explain how hair can be used in a forensic investigation.  •HS-FS-HF-2a Students will identify and describe common weave patterns of textile samples.  •HS-FS-HF-2b Students will compare and contrast various types of fibers through physical and chemical analysis.  •HS-FS-HF-2c Students will describe characteristics of common fibers used in their identification. |
| 5. Forensic Toxicology | •HS-FS-T-1a Students will understand that drugs, toxins and poisons may not be apparent at a crime scene and will learn the types of indicators present.  •HS-FS-T-2a Students will be able to describe the difference between drugs, toxins and poisons.  •HS-FS-T-2b Students will be able to describe and perform the proper steps of collection and preservation of drug evidence in the field.  •HS-FS-T-3a Students will understand the process of isolating and identifying drugs, toxins and poisons in human tissue.  •HS-FS-T-3b Students will understand and appreciate the difficulties in isolating drugs, toxins and poisons in human tissue.  •HS-FS-T-3c Students will be able to compare and contrast chromatography, UV/VIS/IR spectrophotometry and mass spectrophotometry. |
| 6. Fingerprint Analysis | •HS-FS-F-1a Students will be able to describe the physiology of fingerprints.  •HS-FS-F-1b Students will be able to describe, compare, and identify the different types of fingerprints.  •HS-FS-F-1c Students will be able to describe, compare, and perform fingerprint detection techniques.  •HS-FS-F-1d Students will know the historical and current methods for fingerprint matching. |
| 7. DNA Analysis | •HS-FS-D-1a Students will explain the chemical nature of DNA.  •HS-FS-D-1b Students will understand how DNA technology influenced the area of Forensics.  •HS-FS-D-1c Students will explain how crime scene evidence is processed to obtain DNA.  •HS-FS-D-1d Students will explain how DNA is stored and compared in the CODIS system. |
| 8. Blood and Blood Spatter Analysis | • Explain the composition of blood  • Describe how to determine blood type and screen for the presence of human blood  • Conduct a blood spatter  analysis and use to recreate events at a crime scene |
| 9. Impression Analysis | •HS-FS-I-1a Students will be able to describe and identify the different types of impressions at crime scenes.  •HS-FS-I-1b Students will be able to explain what properties are considered individual characteristics of each type of impression evidence.  •HS-FS-I-2a Students will be able to describe and perform collection and packaging of each type of impression evidence.  •HS-FS-I-2b Students will be able to analyze evidence and compare it to a known source in order to make a match. |
| 10. Fire arm Identification and Ballistic Analysis | •HS-FS-FI-1a Students will be able to describe and diagram the fundamental difference between a rifle and a handgun.  •HS-FS-FI-1b Students will be able to compare and contrast how a bullet is fired from a handgun and shot is fired from a rifle.  •HS-FS-FI-1c Students will be able to explain how breech block marks, firing pin marks, ejector marks, and rifling is used as class and individual evidence.  •HS-FS-FI-2a Students will be able to describe and perform collection and packaging of firearm evidence.  •HS-FS-FI-2b Students will be able to compare and contrast comparison microscopes and scanning electron microscopes and explain when each is appropriately used.  •HS-FS-FI-2c Students will be able to explain how gunshot residue, GSR, and GSR patterns are useful in crime scene reconstruction.  •HS-FS-FI-3a Students will understand the history of automated firearms search systems.  •HS-FS-FI-3b Students will be able to analyze the interoperability of local and federal agencies use of NIBIN.  HS-FS-FI-3c Students will be able to explain the lifeline of a bullet as it is entered into evidence and stored in NIBIN. |
| 11. Document Analysis | •Describe the process of collecting of Handwriting Exemplars  • Compare/Contrast Inks and Papers  • Perform photocopier, Printer, and Fax Examination  • Discriminate between document Alterations, Erasures, and Obliterations |
| 12. Arson and Explosive Analysis | •HS-FS-A-1a Students will understand the chemistry of combustion and oxidation-reduction reactions.  •HS-FS-A-1b Students will be able to compare the three types of heat transfer.  •HS-FS-A-2a Students will understand how to identify the point of origin and be able to interpret identifying marks of accelerants in the debris of a fire.  •HS-FS-A-3a Students will be able to distinguish between fire and an explosive by comparing the rate of combustion.  •HS-FS-A-3b Students will be able to compare and contrast low and high explosives.  •HS-FS-A-4a Students will be able to describe the process for gathering evidence in arson and explosion related crime scenes.  •HS-FS-A-4b Students will be able to explain how a gas chromatograph mass spectrometer is used to analyze accelerant and explosive residue.  •HS-FS-A-4c Students will be able to explain how an ion mobility spectrometer and X-ray diffraction is used to analyze explosive particles. |

**Notebook Policy**

All students are required to have a composition notebook or binder for this class. Notebook check will be performed randomly throughout the year and the notebooks will be graded. The notebook check grades could consist of do-nows, objectives, and class work. Students are required to have ALL of the do-nows and objectives written down in their notebook. An absence may excuse the students from being graded on the do-nows and objectives.

**Late Work Policy**

Missed tests, quizzes, class work and homework resulting from an absence should be submitted to the teacher within five (5) days from student’s return.

**Lab Policy and Contract**

Forensic Science is a lab-based course that requires a level of maturity and constant observance of classroom and laboratory rules. The rules are in place to ensure an orderly and safe environment in order to prepare students for a better learning experience. Please review and observe the following rules throughout your term in this course:

1) Always conduct yourself appropriately in the laboratory. Be serious and alert at all times.

2) Follow all written and verbal instructions carefully. If you are not certain about what to do after reading the instructions, please ask your teacher for clarification.

3) You may not eat or drink anything while performing a lab.

4) Do not perform unauthorized experiments.

5) Notify the instructor of any unsafe conditions you observe

6) Instantly report any accident, spill, or injury to your instructor, no matter how minor.

7) If you spill an acid or corrosive chemical on your skin, wash it off immediately using lots of water.

8) Dispose of chemicals properly. Your teacher will inform you of how to do this before the lab.