

NSCI 210

CHEMISTRY AND CRIME

SPRING 2016

Dr. Bettie Davis
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Office Hours: T & TH 10-11 am
or by appointment

Class Time: MWF 11:30 – 12:20 am, Dupre E103

Class Web site on Blackboard - access Blackboard through the Saint Vincent College Portal

Text: Investigating Chemistry, A Forensic Science Perspective, Matthew E. Jhll

When a person registers to vote, the name of the person is placed in a pool of potential jurors. At some point during that person's life, he/she may be called to serve on jury duty. In today's world of novels, movies and television, how is the general population able to decide between fact and fiction when it comes to scientific evidence presented in a legal context? Chemistry and Crime is a course for non-science majors at Saint Vincent that looks at the chemistry underlying both the crime and the analysis of evidence. These concepts will help explain how various forms of evidence can be left at the scene of a crime, how the evidence is found, and how the laboratory can determine the relevancy of that evidence. We will be studying basic chemical principles such as chemical bonding, solubility, and the structure and function of organic molecules. Specific learning objectives include:

- to help students develop an appropriate understanding of basic scientific concepts important in the analysis of forensic evidence;
- to examine how these concepts are applicable to specific cases;
- to explore the relationship between the science important in forensic and ethical/legal perspectives in the context of specific forensic cases;
- to develop students' abilities to assess the quality and relevance of evidence and arguments derived from it in the context of forensic investigations;
- to help students further develop their problem solving and critical thinking skills.

This course does not require math skills beyond pre-algebra.

The students also study cases from the Innocence Project as a way to see how evidence can be used for and against a person. By the end of this course, each student should be able to:

- a) identify and understand the basic chemistry behind evidence collection and testing;
- b) objectively think about evidence presentation and how this evidence could affect the outcome of a trial.

The goal is that by the end of the course, student awareness of their responsibilities as potential jurors has become clearer and they understand that serving as a juror may involve holding a person's life in their hands.

As a course that partially fulfills the natural sciences requirement of the Saint Vincent College Core Curriculum, this course aims to fulfill the following goals of the Core

Curriculum:

"To promote understanding of the natural sciences"

Scientific literacy is demonstrated when a person can

- ✓ describe the nature of scientific knowledge, use the scientific method, and comprehend, present and critique scientific work;
- ✓ explain the most fundamental observations and models developed in the process of scientific inquiry;
- ✓ evaluate the impact science has had on the human condition.

"To form habits of ordered inquiry, logical thinking, and critical analysis"

- ✓ analyze the reasons leading to specific ideas;
- ✓ evaluate the views of others based on appropriate evidence;
- ✓ use directly collected data or data given to construct knowledge by organizing (synthesizing, sequencing, or interpreting) the new information with previous background;
- ✓ critically review habitual assumptions in order to accommodate existing beliefs and assimilate new knowledge

If you have a question...

My office hours are listed on my office door. If the ones posted are not convenient, please talk to me about other possible times. I am willing to meet with students almost anytime, but prior arrangement helps me to insure that nothing else comes up to interfere with meeting a student. In addition, you are welcome to call me in my office or at home; both phone numbers are at the top of the syllabus. My email address is also listed at the top of the syllabus. I will reply to all emails within 24 hours (during the week), although I typically check my email several times a day when on campus.

Note regarding email communication – With spam and junk email becoming more and more of a problem, I have been forced to delete without reading emails that come from accounts that I don't recognize or that have blank/strange subject lines. If you send me an email, particularly from a non-SVC email address, please make sure that the subject line is **not** blank but contains something that I will recognize as "not spam or junk."

Teaching Philosophy and How This Class is Designed

Good practice in undergraduate education includes the following:

Good practice encourages cooperation among students. Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions sharpens thinking and deepens understanding.

Good practice encourages active learning. Learning is not a spectator sport. Students do not

learn much just by sitting in classes listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives. They must make what they learn part of themselves.

Good practice emphasizes time on task. Time plus energy equals learning. There is no substitute for time on task. Learning to use one's time well is critical for students and professionals alike.

Good practice communicates high expectations. Simply put, I expect all students to do well. That doesn't mean that everyone has earned an "A" at the end of the course, but that the grade each student receives at the end of the semester will be reflective of the best quality work that student can do.

(The above statements of good practice draw heavily from Chickering, A.W., & Gamson, Z.F. (1987). "Seven principles for good practice in undergraduate education " *AAHE Bulletin*, 39(7): 3-7.)

Exams - There will be four in-class exams during the semester, each worth 100 points each. Tentative dates for the exams are given at the end of this syllabus; each exam will cover three or four chapters.

Final Group Project - Instead of a final exam at the end of the semester, students are required to give a final presentation. Each group will examine a case from the news or from The Innocence Project. The presentation will consist of an introduction to the case/crime involved, overview of the evidence collected and tested and what scientific principles were important in the analysis, an overview of the verdict and how the evidence was used to convince the jury, and an assessment by the group of whether or not they see the verdict as valid.

Course Grade Summary

4 in-class exams (100 points @)	400 points
final presentation	100 points

Total	500 points

Final grades will be determined from the grading scale found in the College Bulletin.

Attendance can be a factor in your final grade. Excused absences (medical, family emergency, recognized off-campus academic activities) are understandable and something that I'm happy to work around, but numerous excused absences will affect your performance on exams and homework projects. Absences when an exam is scheduled will require documentation (note from doctor, health center, or appropriate College

administrator); exams must be made up within 72 hours. An exam missed because of an unexcused absence cannot be made up. There is no other penalty for unexcused absences...but over the years I've taught the course I have seen a clear relationship between class attendance and being successful in this course.

While class participation is not an explicit component of your grade in this course, student who are actively involved on a regular basis in class and are on the border between two grades will receive the higher of the two possible grades.

Best Effort and Respect

In this class the expectation is that everyone is putting forth their best effort. Examples of ways students put forth best effort include:

- Attending class sessions.
- Arriving to class in a timely manner.
- Doing the reading before class.
- Arriving prepared to class.
- Asking questions and actively engaging the material in class.
- Doing the assignments required in the class.
- Doing one's own work.
- Turning in assignments on time.

I put forth my best effort also. Examples of this effort include:

- Maintaining knowledge of the material.
- Clearly communicating expectations for the course from the first day of class.
- Providing a clear syllabus and outline of the course. (The syllabus and course materials are also available on Blackboard.)
- Preparing instruction before class.
- Offering ways to engage the material in class.
- Structuring assignments to fulfill the learning objectives.
- Encouraging questions in class.
- Offering feedback on assignments.
- Being available outside of class. (Students can reach me via phone or email, during office hours, and by appointment.)
- Providing additional resources to the class.

In this class the expectation is of mutual respect. I will show respect for students. Students will show respect for me as the instructor. Students will show respect for one another. Examples of ways to show respect for others include:

- Listening when others talk.
- Listening means that you are not talking or engaging in side conversations with your neighbors.
- Listening means one person talks at a time.
- You may not always agree with the opinions others express in class, but as a

professional you will need to learn to listen to others whose opinions differ from yours.

- Differences in opinion are inevitable and to be expected.
- Differing opinions can be expressed in ways that communicate respect.

Communicating respect for others means treating others the way you would like to be treated. Working to diminish or eliminate the following communicates respect:

- Limiting interruptions communicates respect. This means turning off your cell phone when you come to class or putting it on the vibrate mode.

Entering the room quietly when you are late or exiting quietly if you must leave early communicates respect.

Important Class Policies

Saint Vincent College has an academic honesty policy, found in the current College Bulletin. Please refer to the *Bulletin* for details. Cheating or plagiarism will not be tolerated. Plagiarism is defined as the act of presenting another's original idea or product as one's own. Whenever an idea comes from another source, it must be cited.

Students with disabilities who may be eligible for academic accommodations and support services should please contact Mrs. Sandy Quinlivan (724-805-2371, sandy.quinlivan@stvincent.edu) or by appointment (Academic Affairs-2nd floor of Headmaster Hall). Reasonable accommodations do not alter the essential elements of any course, program or activity. The Notification of Approved Academic Accommodations form indicates the effective date of all approved academic accommodations and is not retroactive.

In case of adverse weather or illness that requires me to cancel class, I will do the following by 8:00 am that day:

- post an announcement on the course Blackboard site
- leave a recording in my office

If there is nothing on the Blackboard site **and** no message on my voicemail, then you should assume that class is being held. I understand that adverse weather may affect the ability of commuter students to make it to campus; no student should ever feel compelled to take unnecessary risks to make it to class. If adverse weather prevents you from coming to class, let me know by phone or email and we will make appropriate arrangements.

If you have the flu, please let me know (phone or email) and stay home for 24 hours after the fever has gone. Arrangements for making up work that was missed will be made after you are healthy enough to return to class.

Make-up exams can only be arranged for legitimate absences where documentation is provided.

The schedule included in this syllabus and assignments are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students.

IMPORTANT DATES

January 18	Last day to add/change courses
January 25	Last day for withdrawal without permanent record on transcript
March 21	Withdrawals are "WF"

TENTATIVE SCHEDULE OF TOPICS FOR NSCI 210

<u>Dates</u>		<u>Topics</u>
January 11		Introduction to Forensic Chemistry (Chapter 1)
January 13-18		Evidence Collection (Chapter 2)
January 20-27		Atomic Clues (Chapter 3)
January 29, 1,		Chemical Evidence (Chapter 4)
February 3 - 8		Chemistry of Bonding (Chapter 5)
<i>February 10</i>		<i>Exam 1</i>
February 12-19		Properties of Solutions I (Chapter 6)
February 22-26		Properties of Solutions II (Chapter 7)
February 27 - March 6		NO CLASS - SPRING BREAK
March 7-21		Drug Chemistry (Chapter 8)
<i>March 23</i>		<i>Exam 2</i>
March 24 - 28		EASTER VACATION
March 30 - April 6		Arson Investigation (Chapter 9)
April 8 - 18		Chemistry of Explosions (Chapter 10)
<i>April 20</i>		<i>Exam 3</i>
April 22-27		DNA Analysis (Chapter 14)
<i>April 29</i>		<i>Exam 4</i>
<i>Tuesday, May 3 8:30 - 10:30 AM</i>		<i>GROUP PRESENTATIONS</i>