

**Introductory Forensic Chemistry Syllabus, CH 103**  
**Master Syllabus**  
**Department of Chemistry, Washburn University**

**Purpose:** “This course emphasizes the history, philosophy, and major theories of chemistry as they apply to current forensic analytical techniques.” This liberal arts class entails learning, thinking about, and applying major laws, concepts, and theories of chemistry to issues confronting the practicing crime scene analyst, forensic scientist, and law enforcement.

The Student Learning Outcome (SLO) “Creative and Critical Thinking” will be emphasized to satisfy general education requirements in “The World of Nature” area of knowledge.

Analytical thinking will be stimulated by problem solving activities using the scientific method. The course will also promote synthesis of knowledge gleaned from related learning units and current accredited forensic practices. Some mathematical reasoning will be used to understand fundamental principles and their relationship to selected societal issues. Because writing is a wonderful tool for dissecting, synthesizing, learning and expounding on information, the student will have ample opportunities to write essays. Testing will stress problem-solving skills as well as short answer and essay writing skills.

Course material will be covered through a combination of lecture, the Socratic method and/or discussion. Chemistry and Critical Thinking will be learned by various methods including homework, group discussion, demonstrations, quizzes, and/or examinations. All essay discussion questions should be answered in paragraphs containing complete sentences; responses not satisfying this requirement will be downgraded.

Creative and Critical Thinking – This SLO will be evaluated through the online discussion board and the CSI final paper using the “Critical Thinking VALUE Rubric” below. While the delineations of points for an individual section will be specified on the applicable course syllabus, the aggregate grades on the discussion boards and CSI Final paper will constitute more than 30% of the final grade of the course.

The course objectives are as follows:

1. Students will be able to apply their knowledge of chemistry to debate the value of evidence and results to both the crime scene evidence collector and the lawyer. This will be assessed using an online discussion question.
2. Students will be able to comprehend forensic lab reports and their limitations while extracting meaningful results. This will be assessed using an online discussion question.
3. Students will be able to apply their knowledge of chemistry to correctly select the services/methods that would provide the most useful information for case evidence. This will be assessed using a final paper assignment.

**Prerequisite:** No prerequisite

**Textbook (as specified in the instructor syllabus):**

- *Investigating Chemistry*, by Johll, 3<sup>rd</sup> Ed., 2013

**GRADING SCALE:**

A	90-100	For “Pass-Fail”
B	80-89	Minimum passing grade is 60% of
C	70-79	total points.
D	60-69	
F	0-59	

Grade calculation = student points/total points x 100

## Critical Thinking VALUE Rubric

*Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.*

	<b>Capstone</b>	<b>Milestones</b>		<b>Benchmark</b>
	5 points	3-4 points	2-3 points	1 point
<b>Explanation of issues</b>	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description.
<b>Evidence</b> <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/evaluation. Viewpoints of experts are taken as fact, without question.
<b>Influence of context and assumptions</b>	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting
<b>Student's position (perspective, thesis /hypothesis)</b>	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.
<b>Conclusions and related outcomes (implications and consequences)</b>	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

**Honors credit** for CH 103 will be through an individual honors contract between the student, the professor, and the Dean of the Honors program. While there may be a slight variations, in most cases an additional paper will be required as described below. The grade on the paper will be incorporated into the overall grade in the course.

### **Honors Assignment for CH103**

**Chemistry at work at the KBI:** Did you know that chemistry plays a role in every lab section of the KBI? Your job is to find out how chemistry is involved in each section! You will turn in a paper that explains the role of each section of the KBI and how chemistry is involved in one of their techniques used to analyze evidence. If you need help with some of them, email your instructor to request an interview with a scientist from a particular section. This assignment will be due on an agreed upon date near the end of the semester. It should be at least 5 pages long not including works cited, (may be double spaced) but it may be longer. It should be in APA format (see “Preparing a Research Report” and the *ACS Style Guide*, by J. S. Dodd). It may differ slightly since you are not writing an article with an abstract, materials and methods, etc.; but, the overall format citing references and other details should conform to the guide. At least 5 different references, which may include your textbook, should be used as references.

The 9 sections of the KBI include the following: Chemistry, Toxicology, Trace, Digital, Biology, DNA Databank, Questioned Documents, Latent Prints and Firearms.

The following criteria will be used to grade the assignment:

<b>Criteria</b>	<b>Point Value</b>
Explanation of each section's function	45
Choosing a viable technique in each section	45
Explaining the chemistry in each section	45
Creativity	15
APA format	15
at least 5 pages not including works cited	15

**Total point Value** **180**