**Chemistry 1450**
**College Chemistry I**
**Fall 2016**

**Instructor:** Dr. Faith Yarberry
**Office:** Laney-Manion Annex – Rm 129
**Phone:** 501-852-2530
**Email:** fyarberry@uca.edu
**Office Hours:** MW 9:00-11:00 am, T 9:30 – 11:00 am in Laney Annex 129

## Course Information:

**Lecture:** Laney-Manion 104 – TR 8:00-9:15
**Text:** *Chemistry A Molecular Approach* (3rd Ed.) by Tro

**Lab:** Laney-Manion 202 R – 10:50-1:30 CRN: 10259
Laney-Manion 202 R - 2:40-5:20 CRN: 14234
**Text:** Labs to be printed from Blackboard

| Course Item | # Given | # Dropped | # Toward Grade | Points per Item | Total Points |
|---|---|---|---|---|---|
| Lab | 11 | 1 | 10 | 15 | 150 |
| In-Class Quizzes | ? | ? | 9 | 5 | 45 |
| Assignments | 2 | 0 | 2 | 20 | 40 |
| Math Video/Quiz | 8 | 0 | 8 | 10 | 80 |
| ACS Exam | 1 | 0 | 1 | 25 | 25 |
| Pseudoscience Fair | 1 | 0 | 1 | 100 | 100 |
| Exams | 4 | 1 | 3 | 120 | 360 |
| Final Exam | 1 | 0 | 1 | 200 | 200 |
| **Total** | | | | | **1000** |

**Grades: A: 900 - 1000 points B: 800-890 C: 700-790 D: 600-690 F: < 600**

*The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Office of Disability Services, 450-3613.*

**Course Description** Principles of general chemistry with emphasis on their theoretical and quantitative aspects and applications.

**Prerequisites** It is recommended that students have taken and passed high school chemistry or have completed CHEM 1301 with a C or better. Prerequisite: ACT mathematics score of at least 21 or corequisite/prerequisite of MATH 1390.

**Materials Required**

Graphing Calculator
Goggles
Textbook
Printed Laboratories (On Blackboard)
Signed Safety Agreement
EdPuzzle Account
Informed Consent Form(s)
QR Code App for I-phone or Android Preferred

**Course Objectives**

Upon completion of this course, the student should have gained:

- The ability to use Scientific Notation and Significant Figures in Calculations.
- The ability to correctly name and give the formulas of simple ionic and covalent molecules.
- The confidence to perform Stoichiometric calculations involving molar mass, mole-to-mole ratios, Avogadro's number, and molarity.
- The ability to predict the products of precipitation and acid-base neutralization reactions and understand what is occurring in solution during the reaction.
- The knowledge necessary to work with redox reactions.
- An understanding of how to calculate the heat of and enthalpies of reaction and their meanings.
- An understanding of the structure of an atom of an element and its impact on the elements reactivity.
- The ability to draw simple molecules and predict their shape, hybridization, and polarity.

**Attendance**

Each class meeting is important to the course development. Class begins at 8:00 am and ends at 9:15 am. Roll will be taken. 4 unexcused absences may result in a WP or WF grade at the instructor's discretion. It is the responsibility of the student to obtain any information covered during their absence.

Attendance in the laboratory is mandatory. More the two absences **WILL** result in the student being dropped from the course with a WP or WF at the discretion of the instructor.

**Homework**

Students will be assigned video lectures to watch prior to each class. The instructor will do a short recap of the lecture in class.

In class problems will be found on Blackboard. You must print the problems before attending class.

**Assignments**

Two group assignments will be given throughout the semester. Each group will be given a YouTube Video to watch. The video will emphasize a topic being discussed in class. Your group will analyze the video, make comments on a Google Doc (shared by your instructor), and write a paper describing the information in the video which will be submitted through Blackboard.

**In-class Quiz**

Quizzes will be administered periodically throughout the semester at the start of a class prior to announcements. Students will be given 5 minutes to complete the quiz. The quiz will cover material discussed in the previous lecture or the concept presented in the video assignment.

**Math Quiz** Chemical concepts containing math will be the focus of a mathematical tutorial available through Blackboard and EdPuzzle. The tutorial will consist of a pre-quiz (on Blackboard), a video explanation of the mathematical concept (on EdPuzzle), and a post-quiz (on Blackboard). All three components will be worth 10 points each. The resultant grade will be incorporated in your overall grade. The required mathematical tutorial WILL be announced in the class prior to its due date.

**ACS Exam** The American Chemical Society College Chemistry I exam will be administered during the last lab meeting of the semester. The result of the exam WILL constitute up to 25 points of your course grade. If you score a C or better on the ACS exam, the instructor will determine what your course grade would be if the ACS exam counted for itself and the Final Exam grade. If the student is satisfied with this grade, they can email the instructor asking that the ACS exam be used as the Final exam thereby eliminating the need for the student to take the official Final exam.

**Exams** 4-75 min exams will be administered on the dates listed in the syllabus beginning at 8:00 am. The final exam will be held December 8$^{th}$ from 8:00-10:00 am. Plan your schedule accordingly because make-up exams will NOT be offered. Missed exams will be dropped up to the allotted number.

**Laboratory Grade -** Laboratory experiments will constitute 150 points of your grade. Each lab will be graded out of 15 points. (Lab Lectures count as a single lab grade of 15 points)

| Laboratory Grade | Points | When Due |
|---|---|---|
| Quiz | 3 | A pre-lab quiz worth 2 points will be given at the start of lab. The quiz will cover the background and procedure found in the laboratory videos. |
| Data / Results | 3 | At the end of lab (one per group) |
| Post-Laboratory | 4 | At the end of lab (one per group) |
| Participation and Safety | 4 | Throughout lab the First safety violation receives a warning, the second safety violation you will lose 2 points. A third violation and you will be told to leave the lab. Each student is expected to participate in a lab role. Failure to do so will constitute a loss of up to 2 points as determined by the instructor and TA. |
| Post-Evaluation | 1 | A post-lab survey will be required upon completion of the lab. The post-lab survey will be found on blackboard and will due by 8:00 a.m. on the Friday after the lab. You will receive 1 point for completing the survey and 0 points if you do not complete the survey. |
| **Total** | **15** | |

**Laboratory Role**

Chemistry is an experimental science. Lab time is your chance to master some of the experimental aspects of the subject. You will work in groups in the lab, but you will still be expected to actively participate in the experiments. Passive observation in lab while your partners do the work is unacceptable and will cost you up to 2 points. The TA and your instructor will determine participation points.

Each group will consist of three to four roles. These roles will be assigned at the start of each lab. If your group consists of only three members, the Scribe and Mathematician roles will be combined. The roles are:

Leader – Keeps the group on track, understands the background.
Lab Tech – Knows the procedure in advance, leads the group through the procedure.
Scribe – Records all information on the data/results and post laboratory sheets
Mathematician - Makes sure all recorded values are to the correct number of significant figures.

Your participation will be graded on the efficiency by which you carried out your role, whether you participated in completing the experiment and whether you helped in the completion of the calculations on the data/results sheet.

**Data/Results**

Your data must be recorded to the correct number of significant digits. Your results will be graded for correctness in calculations, the correct number of significant digits, and for accuracy.

**Post Lab**

Your post-laboratory will be graded for thoughtful answers based on your data/results and for correctness. The groups' data/results sheet and post-lab will be stapled in order of occurrence and left at the group laboratory station.

**Safety**

Safety is Mandatory. You will not be allowed to enter the lab without closed toe shoes and goggles. You will be warned upon your first safety violation. A second violation will result in the loss of 2 points. The third violation will result in you being required to leave the lab for that day and receiving a zero for that lab.

**Safety Agreement**

Before being permitted into the first lab, you must complete the safety agreement at uca.edu/web/forms/view.php?id=353

## Pseudoscience Fair

This course contains a Service-Learning component. The Service-Learning component will be a 2 to 3-person group project The Service-Learning Project will involve participation in a Pseudoscience Fair put on by the STEM Residential College at Arkansas Hall on the UCA campus. Completion of the project will constitute 100 points of your grade. The top 4 teams will be chosen to take their project to a local Science Night. These 8-12 people will receive 50 points on their Final Exam.

## Objectives

Students will: (1) learn to work in teams, (2) think critically about scientific information, and (3) learn to communicate scientific concepts to a broad audience.

## Process

The group will:

- Consist of group members assigned by the instructor.
- Decide on a product to research
- Meet with the instructor on two occasions (described below).
- Develop a PowerPoint or poster (obtain poster template from instructor)
- Present their findings at the Pseudoscience Fair.
- Submit a paper over their topic.
- Evaluate their participation and the participation of the other members of their group.

**Pseudoscience Fair Grade:**

| | |
|---|---|
| Email with Group Member Names, Topic, and Format | 5 |
| Initial Meeting with Instructor | 10 |
| Second Meeting with Instructor | 10 |
| Quality Communication at Pseudoscience Fair | 15 |
| Presentation | 15 |
| Paper | 20 |
| Self-Evaluation | 15 |
| Member Evaluation (Participation) | 10 |
| **Total** | **100** |

**Description of Grade**

The group will:

- Submit an email to the instructor with the group members names, topic, and the format for their presentation (poster or powerpoint)
- First meeting with Instructor
  Each group member will need to have researched one paper regarding the topic of choice. You will be evaluated on your interaction with the instructor, preparedness of topic, etc.
- Second meeting with Instructor
  You will be evaluated on your interaction with the instructor, and the quality of your presentation (you will be expected to have made significant strides in developing the presentation and if presenting a poster, you will be expected to have it complete by October 12th
- Quality Communication at Pseudoscience Fair
  5 pts - attends
  10 points - articulating the science in a manner where attendees understand
- Presentation
  5 pts – well written and visually appealing
  10 pts – comprehensive
- Paper
  The paper must have an introduction, scientific explanation, and conclusion. The material must be supported by a minimum of one reference per group member which must be from a peer evaluated journal. Your grade will be determined on the quality of the paper and its science.
- Self-Evaluation
  5 pts – completion
  10 potints – thoughtful completion
- Member Evaluation
  0 points if your group member and instructor determines that you did not participate
  2-10 points depending on your degree of activity within the group as indicated by the other members' evaluation and the instructor's evaluation.

**Pseudoscience Fair Calendar:**

| Date | Location | Time |
|---|---|---|
| 9/5/2016 | Email Due | Noon |
| 9/5-16/2016 | Must have First Meeting with Instructor | TBD |
| 10/3-11/2016 | Must have your Second Meeting with the Instructor | TBD |
| 10//17/2016 | Posters must be turned in for printing | Noon |
| 10/24/2016 | Pseudoscience Fair – Student Center Ballroom | Noon – 4:00 pm<br>Set-up starting at 11:30 am |
| 11/17/2016 | Paper Due | 8:00 am |
| 11/17/2016 | Member Evaluation Due | 8:00 am |
| 11/17/2016 | Self-Evaluation Due | 8:00 am |

## General Information:

**Office Hours**

This time is specifically set aside for you to ask me questions and receive help on course material. Use this time! **If you cannot make the scheduled times, make other arrangements with me.**

**Academic Integrity**

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

**The penalty for academic dishonesty on an exam is this course is that the student will receive a zero for that exam and the exam grade will be counted into their final average. Plagiarism on any paper and the student will receive a zero for that grade.**

**Emergency Procedures Summary**

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at *http://uca.edu/mysafety/bep/.* Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

**Title IX Disclosure**

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: https://uca.edu/titleix. **Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.*

**Other Policies**

Information concerning University Academic Policies (such as the Sexual Harassment Policy and Academic Policies) can be found in the Student Handbook. Students should familiarize themselves with all policies listed in the Student Handbook at http://uca.edu/ubulletin2015/general-policies-information .

# Schedule

Test and Lab Dates are Set

| Date | In Class Discussion | Assigned Videos to Watch Before Next Class | Practice Problem to Print Before Next Class |
|---|---|---|---|
| Aug 18 | Syllabus, Periodic Table Introduction | Matter and Changes<br>Measurements<br>Significant Figures | Matter and Changes<br>Measurements<br>Significant Figures |
| **18** | **No Lab** | | |
| 23 | Chapter 1 | Units of Measurements<br>Scientific Notation and Calculator<br>Energy, Heat, and Temperature Conversions | Calculations and Conversions |
| 25 | Chapter 1 | History Behind the Atomic Structure<br>Protons, Neutrons, Electrons – Neutral Atoms | Law of Mass Conservation<br>Proton, Neutrons, Electrons – Neutral Atoms |
| **25** | **Measurements Lab** | | |
| 30 | Chapter 2 | Proton, Neutrons, Electrons – Ions<br>Average Atomic Mass | Protons, Neutrons, Electrons – Ions<br>Average Atomic Mass |
| Sept 1 | Chapter 2 | Ions | |
| **1** | **Separations Lab** | | |
| 6 | Chapter 3 | Formulas of Ionic Compounds<br>Naming Ionic Compounds<br>Ionic Hydrates | Ionic Blocks Exercise<br>Ionic Compound Practice |
| 8 | Chapter 3 | Covalent Molecules<br>Acids<br>Formula Mass, Molar Mass, % Composition | Covalent Molecules<br>Formulas Mass, Molar Mass, % Composition |
| **8** | **Density Lab** | | |
| 13 | Chapter 3 | | |
| *14* | *Study Session* | | *6:00-8:00 STEM RC Classroom* |
| **15** | **Exam 1** | Balancing Chemical Equations<br>Reaction Calculations<br>Solution Calculations | Balancing Chemical Equations<br>Reactions Calculations<br>Solution Calculations |
| **15** | **Hydrate Lab** | | |
| 20 | Chapter 3&4 | Electrolyte<br>Reaction Equation Types<br>Precipitation Reactions | Electrolytes<br>Precipitation Reactions |
| 22 | Chapter 4 | Acid Base Neutralization<br>Titrations | Acid Base Neutralization |
| **22** | **Lab Lecture** | | |
| 27 | Chapter 4 | Redox Reactions<br>Gas Evolving Reactions<br>Gas Law | Redox Reactions |
| 29 | Chapter 4 | Energy | Energy |
| **29** | **Lab Lecture** | | |

| | | | |
|---|---|---|---|
| Oct 4 | Chapter 5&6 | | |
| *5* | *Study Session* | | *6:00-8:00 STEM RC Classroom* |
| **6** | **Exam 2** | Heat Capacity Video<br>Heat Capacity Math Video<br>Heat Exchange Math Video<br>Work, Energy and Calorimetry<br>Enthalpy | Specific Heat<br>Calorimetry |
| **6** | **Reactions Lab** | | |
| 11 | Chapter 6 | Hess's Law<br>Enthalpies of Formation | Hess's Law<br>Enthalpies of Formation |
| *13* | *Fall Break* | | |
| **13** | **No Lab** | | |
| **17** | **Pseudoscience Fair Poster Due** | | |
| 18 | Chapter 6 | History Behind the Atomic Structure<br>Energy Math Video<br>Atomic Spectra<br>Rydberg –Balmer Equation<br>Rydber-Balmer Math Video | Energy and Rydberg Balmer Calculations |
| 20 | Chapter 7 | Quantum Mechanics | Quantum Numbers Introducation |
| **20** | **Acid/Base Titration Lab** | | |
| **24** | **Pseudoscience Fair** | | |
| 25 | Chapter 7 | Electron Configurations | Electron Configurations and Quantum Numbers |
| 27 | Chapter 8 | Electron Configuration of Ions<br>Atomic and Ion Trends | Electron Configuration of Ions<br>Atomic Trends |
| **27** | **Gas Law Lab** | | |
| *28* | *W Deadline* | | |
| Nov 1 | Chapter 8 | | |
| *2* | *Study Session* | | *6:00-8:00 STEM RC Classroom* |
| **3** | **Exam 3** | Introduction to Lewis Structures | Introduction to Lewis Structures |
| **3** | **Thermochemistry Lab** | | |
| 8 | Chapter 9 | Lewis Structures of Ionic Compound | Lewis Structures of Ionic Compounds |
| 10 | Chapter 9 | Lewis Structures of Covalent Molecules | Lewis Structures of Covalent Molecules |
| **10** | **Spectroscopy Lab** | | |
| 15 | Chapter 9 | Bond Polarity<br>VSEPR PowerPoint Video<br>VSEPR Video | Bond Polarity and Strength<br>Chapter 10 Optional Homework |
| 17 | Chapter 9&10 | | |
| **17** | **Pseduoscience Fair Paper and Evals due** | | |
| **17** | **VSEPR Lab** | | |
| *20* | *Study Session* | | *6:00-8:00 STEM RC Classroom* |

| | | | |
|---|---|---|---|
| **22** | **Exam 4** | | |
| *24* | *No Class - Thanksgiving Break* | | |
| ***24*** | ***No Lab – Thanksgiving Break*** | | |
| *28* | *WP/WF Deadline* | | |
| 29 | Chapter 10 | Valence Bond Video | |
| Dec 1 | Chapter 10 | | |
| **1** | **ACS Exam** | | |
| *2* | *Study Day* | | |
| **8** | **Final Exam (8:00-10:00 am)** | | |

## Technology Instructions

Laboratory Safety Agreement – required for admittance to first lab

Go to https://uca.edu/web/forms/view.php?id=353
Complete the Form

Blackboard – contains PowerPoints, Optional Homework, Syllabus, Evaluation forms, etc.

Log into your MyUCA account
Click on the My Courses tab
Click on College Chemistry I

EdPuzzle

http://www.EdPuzzle.com
Click on I'm a new Student and Complete the Form
User Name (make sure you remember it as I will not have access to this information)
Password ((make sure you remember it as I will not have access to this information)
Click Sign Up
Click Join Class
Type: vaherug
Search
Join

Pseudoscience Fair Evaluations

Individual Evaluation - https://uca.edu/web/forms/view.php?id=957
Group Evaluation - https://uca.edu/web/forms/view.php?id=956

**Opportunities for Bonus Points (You can earn up to 40 point maximum.)**

| Opportunity | Attendance | Evaluation | Prep Attend |
|---|---|---|---|
| Chalk Talk – Sept 15, 6:00-7:00 pm, STEM@Arkansas Classroom | 5 | | |
| Chalk Talk – Oct 6, X-Period, Laney-Manion 104 | 5 | | |
| Chalk Talk – Nov 15, X-Period, MCS 220 | 5 | | |
| Family Day – Sept 10, 2:00-5:30 pm, Practice Field | 5 | | |
| Seminar (Each seminar indicated by instructor) | 5 | | |
| MapWorks Completed (show print-out or screen shot of completion screen) – Sept 15, 8:00 am | 5 | | |
| Map-Works Evaluation - Sept 17, 8:00 am (Found under Course Bonus folder in Blackboard) | | 10 | |
| Science Night (Each event) | 10 | | |

Attendance Points – Sign in with Dr. Yarberry and participate in order be considered as attending

MapWorks Evaluation – Complete the form available on Blackboard

| Lab | |
|---|---|
| Measurements | _____/15 |
| Density | _____/15 |
| Separations | _____/15 |
| Hydrate | _____/15 |
| Lecture | _____/15 |
| Reactions | _____/15 |
| Acid/Base | _____/15 |
| Gas Law | _____/15 |
| Thermochemistry | _____/15 |
| Spectroscopy | _____/15 |
| VSEPR | _____/15 |

| Pseudoscience Fair | |
|---|---|
| Email | _____/5 |
| 1st Meeting | _____/10 |
| 2nd Meeting | _____/10 |
| Communication | _____/15 |
| Presentation | _____/15 |
| Paper | _____/20 |
| Self Eval | _____/15 |
| Member Eval | _____/10 |

| In-Class Quiz | |
|---|---|
| Quiz 1 | _____/5 |
| Quiz 2 | _____/5 |
| Quiz 3 | _____/5 |
| Quiz 4 | _____/5 |
| Quiz 5 | _____/5 |
| Quiz 6 | _____/5 |
| Quiz 7 | _____/5 |
| Quiz 8 | _____/5 |
| Quiz 9 | _____/5 |
| Quiz 10 | _____/5 |
| Quiz 11 | _____/5 |
| Quiz 12 | _____/5 |
| Quiz 13 | _____/5 |

| Exams | |
|---|---|
| Exam 1 | _____/120 |
| Exam 2 | _____/120 |
| Exam 3 | _____/120 |
| Exam 4 | _____/120 |

| Math Quiz | |
|---|---|
| Math Tutorial 1 | _____/10 |
| Math Tutorial 2 | _____/10 |
| Math Tutorial 3 | _____/10 |
| Math Tutorial 4 | _____/10 |
| Math Tutorial 5 | _____/10 |
| Math Tutorial 6 | _____/10 |
| Math Tutorial 7 | _____/10 |
| Math Tutorial 8 | _____/10 |

| Group Assignments | |
|---|---|
| Electrolyte | _____/20 |
| Energy | _____/20 |

| ACS Exam | |
|---|---|
| Exam | _____/25 |

| Bonus | |
|---|---|
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| Course Item | # Given | # Dropped | # Toward Grade | Points per Item | Total Points |
|---|---|---|---|---|---|
| Lab | 11 | 1 | 10 | 15 | 150 |
| In-Class Quizzes | ? | ? | 9 | 5 | 45 |
| Assignments | 2 | 0 | 2 | 20 | 40 |
| Math Video/Quiz | 8 | 0 | 8 | 10 | 80 |
| ACS Exam | 1 | 0 | 1 | 25 | 25 |
| Pseudoscience Fair | 1 | 0 | 1 | 100 | 100 |
| Exams | 4 | 1 | 3 | 120 | 360 |
| Final Exam | 1 | 0 | 1 | 200 | 200 |
| **Total** | | | | | **1000** |

To determine what you need to make on your final exam:

A. Sum of Top 10 Lab Grades _____

B. Sum of Top 3 Exam Grades _____

C. Sum of Pseudoscience Fair Grade _____

D. Sum of Math Quiz Grades _____

E. Sum of Top 9 In-Class Quiz Grades _____

F. Sum of Assignment Grades _____

G. ACS Exam Grade _____

H. Bonus (up to 40 points) _____

**I. Total Sum A – H above** **_____**

For an A on your transcript, the following equation indicates the number of points you need on your final exam.

900 – I = _____

For a B on your transcript, the following equation indicates the number of points you need on your final exam.

800 – I = _____

For a C on your transcript, the following equation indicates the number of points you need on your final exam.

700 – I = _____

For a D on your transcript, the following equation indicates the number of points you need on your final exam.

600 – I = _____

**University of Central Arkansas**
**Informed Consent Agreement**

Development and Implementation of Algebraic/Chemistry Online Tutorial

**You are being asked to participate in a research study. Before you give your consent to volunteer, it is important you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.**

**Investigators**

Faith Yarberry, Ph.D.
Department of Chemistry
University of Central Arkansas
Laney 205
Conway, AR 72035
501-852-2530

Lisa Christman, M.S.
University College
University of Central Arkansas
Main Hall 29B
Conway, AR 72035
501-450-3220

**Purpose of the Research**

This research study is designed to determine the effectiveness of a new Algebraic/Chemistry Online Tutorial.

The data from this research will be used to develop and improve new video tutorials that help students connect mathematical concepts learned in previous classes to those utilized in freshman-level chemistry classes.

**Procedures**

As part of the course you will be required to watch multiple videos illustrating mathematical and chemical concepts throughout the semester and complete a Math Quiz related to the video. If you volunteer to participate in this study, the results of your quiz and exam grades will be compared to grades obtained from a control group under the same instructor during previous semesters.

Your participation will take approximately one hour three times during the semester.

The Algebraic/Chemistry Online Tutorial is experimental. It is believed that, due to the method of presentation, it will benefit the students at comprehending mathematical and scientific concepts.

**Potential Risks or Discomforts**

There are no foreseeable risks associated with the study.

**Potential Benefits of the Research**

We expect that your grades, on mathematical concepts, to be higher than your predecessors scores in College Chemistry.

We believe that this research will benefit future chemistry students at the university and 9th-12th grade levels in the secondary education system as the Algebraic/Chemistry Online Tutorial is expanded to other sections of the course, other universities, and into the high school classrooms.

**Confidentiality and Data Storage**

Copies of each exam given throughout the semester will be photocopied and identification markers removed. The investigators will compare exam questions between the control group and the test group. Semester grades will be compared between the control group and the test group, but again all identification markers will be removed before the investigators work begins.

The data, used in the research, will be stored in Dr. Faith Yarberry's laboratory for 3+ years in a locked filing cabinet. Dr. Yarberry will be the only individual with access to the data when not being analyzed.

**Participation and Withdrawal**

**Your participation in this research study is voluntary. You may refuse to participate without penalty. If you decide to participate, you are free to stop at any time without penalty by just stopping and/or telling the investigator.**

You may not withdraw from the study after data collection has been completed since your name is not linked to the data.

**Questions about the Research**

**If you have any questions about the research, please ask them now. If you have questions later, you may contact . . . Dr. Faith Yarberry (501-852-2530) or Lisa Christman (501-450-3220).**

**This research project has been reviewed and approved by the Institutional Review Board for the Protection of Human Subjects at the University of Central Arkansas. If you believe there is any infringement upon your rights as a research subject, you may contact the Research Compliance Coordinator at (501) 450-3451.**

***Subject's Agreement***

**I have read the information provided above. My signature below indicates my voluntary agreement to participate in this research study. Please return one copy of this consent form and keep one copy for your records.**

_____ _____

Signature of Research Subject Date

_____ _____

Signature of Investigator (optional) Date

**University of Central Arkansas**
**Informed Consent Agreement**

Flipped Classroom Model

**You are being asked to participate in a research study. Before you give your consent to volunteer, it is important you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.**

**Investigators**

Faith Yarberry, Ph.D. .
Department of Chemistry
University of Central Arkansas
Laney 205
Conway, AR 72035
501-852-2530

**Purpose of the Research**

This research study is designed to determine the effectiveness of a Flipped Chemistry Classroom Model.

The data from this research will be used to develop and improve the classroom experience to enhance students understanding of concepts presented in the freshman-level chemistry classes.

**Procedures**

As part of the course you will be required to watch a portion of the courses chemistry lecture prior to attending class. During the class you will participate in activities designed to improve your understanding of chemical concepts. If you volunteer to participate in this study, your success on quizzes and exams will be compared to grades obtained from a control group under the same instructor during previous semesters.

Your participation should not require additional time then already expected of a student in a first-year chemistry course.

It is believed that, due to the method of presentation, students will develop a stronger foundation of scientific concepts associated with the course.

**Potential Risks or Discomforts**

There are no foreseeable risks associated with the study.

**Potential Benefits of the Research**

We expect that your grades will be higher than your predecessor's scores in College Chemistry.

We believe that this research will benefit future chemistry students at the university and 9th-12th

grade levels in the secondary education system as the style of course will be expanded to other sections of the course, other universities, and into the high school classrooms.

**Confidentiality and Data Storage**

Copies of each exam given throughout the semester will be photocopied and identification markers removed. The investigators will compare exam questions between the control group and the test group. Semester grades will be compared between the control group and the test group, but again all identification markers will be removed before the investigators work begins.

The data, used in the research, will be stored in Dr. Faith Yarberry's laboratory for 3+ years in a locked filing cabinet. Dr. Yarberry will be the only individual with access to the data when not being analyzed.

**Participation and Withdrawal**

**Your participation in this research study is voluntary. You may refuse to participate without penalty. If you decide to participate, you are free to stop at any time without penalty by just stopping and/or telling the investigator.**

You may not withdraw from the study after data collection has been completed since your name is not linked to the data.

**Questions about the Research**

**If you have any questions about the research, please ask them now. If you have questions later, you may contact . . . Dr. Faith Yarberry (501-852-2530) or Lisa Christman (501-450-3220).**

**This research project has been reviewed and approved by the Institutional Review Board for the Protection of Human Subjects at the University of Central Arkansas. If you believe there is any infringement upon your rights as a research subject, you may contact the Research Compliance Coordinator at (501) 450-3451.**

***Subject's Agreement***

**I have read the information provided above. My signature below indicates my voluntary agreement to participate in this research study. Please return one copy of this consent form and keep one copy for your records.**

_____ _____

Signature of Research Subject Date

_____ _____

Signature of Investigator (optional) Date