

GEORGIA HIGHLANDS COLLEGE
Honors Option Contract

Please complete this form and return to the Honors Director.



** electronic submission is preferred **

TO BE COMPLETED BY THE HONORS STUDENT

Student Name

Student ID #

Email

Major

Course Number, Section and CRN Chem 1212k

Course Title Principles of Chemistry II



TO BE COMPLETED BY THE SPONSORING FACULTY MEMBER

Professor Name

Title

Division

Work Phone

Email

Is your division chair aware that you are sponsoring an honors student?

yes no

TO BE COMPLETED BY THE HONORS STUDENT AND FACULTY MEMBER

Attach a description of the plan of study keeping in mind the following: Include information on the topic or problem to be examined, the nature of the reading assignments and the number and nature of reports or projects. Indicate how successful completion of the Honors Option will be determined.

Be as specific as possible about the Focus, Format, Meetings, and Milestones. See <https://sites.highlands.edu/honors/honors-options-contract/> for more information on these terms.

Specify meeting dates for student-faculty consultation (must have at least 3 throughout the semester)

Attach a description of how this course provides an Honors experience for the students. What elements are added or changed? What constitutes academic rigor for this project? How is the assignment substantively and qualitatively different from what regular students in the course would complete in a normal semester?

An assignment that is merely quantitatively *more*, (extra pages, extra sources, etc.) is generally not substantively or qualitatively different, and as such is generally not an adequate honors project.

Please ***attach*** the regular class syllabus along with any additional information needed to clarify the description (e.g. a reading list, assignment instructions, etc.).

The most opportune way to quench humongous thirst on a hot, sunny day is through "soft drinks". The market nowadays offers a wide assortment of sodas. Chemists classify them into two broad categories; clear and dark. The sodas that fall under the clear category have citric acid $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$ (aq) in them to contribute to their sour "tart" taste. On the other side, caramelized dark beverages have phosphoric acid H_3PO_4 (aq) induced in them to provide their flavors. With the help of the common acid-base titration method, I intend on finding the acid concentration present in a few of the most popular beverages. In this experiment stock solution of citric acid and phosphoric acid will be titrated to determine K_{a1} and K_{a2} , and K_{a3} if possible. In addition to the titration of the sodas with standardized NaOH (aq) solution, club soda will be titrated using the exact same procedure as a controlled group. Considering the fact, that most of the beverages are colored, the base used for the titration will be NaOH (aq) with potassium hydrogen phthalate and a pH meter will be used to determine the equivalence point. For this project, I have selected eight beverages (two regular and two zero-sugar versions of the same soda). The names of the samples are listed below;

Dark Sodas;

- Coca-cola
- Diet Coca-cola
- Dr. Pepper
- Zero Sugar Dr. Pepper

Light Sodas;

- Sprite
- Sprite zero sugar

All the liquids will be degassed overnight to remove carbon dioxide from them. The comparison between the concentration of acid in the dark vs. light soda and regular vs. sugar free soda. The results will be compiled and explained.

The meetings will be in Lab J-210 Monday at 3:30pm. Each data collected will be shown to the instructor at the end of the experiment. In addition there will be meetings with the professor to check progress. The tentative schedule is:

02/25/2022 Titrations of stock solutions of citric acid, phosphoric acid, and club soda

03/07/2022 Titration of 2 sodas

03/14/2022 Titration of 2 sodas

03/21/2022 Titration of 2 sodas

03/28/2022 Titration of 2 sodas

03/30/2022 Titration of 2 sodas

04/11/2022 Final Submission of Lab

04/25/2022 Final Submission of Honors Project

This project is based upon the course-based undergraduate research experience (CURE) high-impact practice (HIP) assignment constructed for CHEM 1212K that is not currently a part of the lab portion of this course. Where the HIP is originally a part of the lab experience and consists of minor modifications of existing lab procedures, this project is entirely an addition to the standard lab activity series for CHEM 1212K M1. Moreover, the project as designed includes a wider set of experiments (over four weeks instead of two), more detailed and intensive data analysis, and includes communicating the experiments in writing a formal lab report and presentation preparation. This project, therefore, requires the student to truly go above and beyond the expectations of the course by applying chemical principles to investigate a real-world question and adapt to setbacks should they arise.