Analytical Instrumental Laboratory
CHEM 314; Spring 2020

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Course Name: CHEM 314, 3 credits
Prerequisites: CHEM 212
Location: Reichardt 165 (lecture); Reichardt 245 (lab)
Meeting Time: M 9:15-10:15am (lecture), MW 2:15-5:15pm (lab)
Final: 1-3 p.m., Thursday, April 30 (based on lab meeting time)
Instructor: Dr. Jingqiu Mao
Office: Reichardt 188
Phone: 907-474-7118
Email: jmao2 @alaska.edu
Office Hours: T&TH 3-4PM (other times by appointment).

Recommended Materials:
Skoog, Holler and Crouch, **Principles of Instrumental Analysis**
Harris, **Quantitative Chemical Analysis**.
**** Current editions of textbooks on reserve in Rasmussen Library for 2 hr in-library use****

Course Description: A laboratory course focusing on the acquisition and interpretation of chromatographic and spectroscopic data for quantitative chemical measurements. Students will learn effective experimental planning and execution, critical evaluation of experimental data and written communication in the context of the chemical sciences. Much of this course is student-directed and project based. Students are expected to carefully prepare, plan, and execute experiments with minimal instructor input. CHEM 314 builds on previous experience with analytical chemistry (eg CHEM 212).

Instructional Methods: This class is based on characterizing several products given to each

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Behavior and Collaboration- Students are expected to conduct themselves professionally at all times. Disrespect of the classroom learning environment, instructors, and fellow students is not tolerated! Collaboration and working in small groups is a key component of classroom and lab time.

Attendance, Tardiness, and Late Work- Students are expected to attend class and not compromise the experience of other students. Makeup labs are not available for this course except for school-related travel. Work is not accepted late. This is to keep us all moving though the material efficiently.

Instructor-Initiated Withdrawals- Any time up to and including the final date to drop a course with a

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CHEM 314 Evaluation

There are **1000 total points available** in this class. Grades are assigned on the typical scale 1000-900 A, 899-800 B, 799-700 C, etc.

Assignment	**Points**
Literature review & presentation	100
Reports (7@100 each)	550
Lab notebook	50
Exams (2@100 each)	200

6. **Results**- (1-3 paragraphs) Follows directly from annotated figures and include at least a paragraph for each figure and table. Reference figures in the text.
7. **Discussion**- (1-3 manageable paragraphs) Follows directly from annotated figures.
8. **Conclusions**- (2-5 sentences) saying what you found and what that means.
9. **Acknowledgments**: Research projects are collaborative and substantial contributions have been made by mentors, peers, postdocs, faculty, etc. Any person that significantly contributed to your work and their specific contribution should be mentioned.
10. **References**- If you used anything other than your brains (websites, text books, another group's procedure, instrument instructions), cite these resources appropriately!
11. **Figures and tables**- Each figure and table is to be numbered and on it's own page with a figure title and caption. All measurements should have an error estimate and graphs should have error bars.

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Additional Guidelines for Written Assignments

- Abbreviations are often necessary and should be introduced clearly when used the first time.
- Element names (Iron) are spelled out only if they are the first word in a sentence and when they are part of a name (iron oxides). Otherwise, the symbol is used (Fe).
- Succinct description and clear reference in text to all figures and tables in the text.
- Do not duplicate data between the text and figures or tables
- Use SI units or the standard units in the field for all laboratory data. Appropriate formatting is used to indicate units. For example, mg kg^{-1} is correct, while mg/kg or ppm is not. Pay attention to these details in the literature you are reviewing.
- Use bold font to indicate references to figures, tables, and equations in the text. This helps during the proofreading process. Reference to **Figure 1** in the middle of a sentence and at the end of the sentence (**Fig. 1**). The word is always spelled out in entirety (**Table 1**).
- All figures and tables must have a descriptive caption clearly explaining the figure. Explain all abbreviations and symbols used in the figure and provide sufficient experimental and statistical detail.
- Provide sufficient experimental detail to allow reproducibility by a person with a similar skill level as yourself.
- Provide details on the origin of chemicals you use. Example: sodium chloride (JT Baker, lot 324)
- If instrumentation is used, report the make and model number of the instruments and location of manufacture. Example: 7500 series High Performance Liquid Chromatography (Agilent; Ames, IA)
- If non-standard software is used, report the version of the software and reference the developer. Example: Sixpack (version 1.57; Webb, 2006).
- Pay attention to significant figures. All measurements should have an uncertainty associated with them. Error only has one significant figure, and this often limits the number of significant figures in a measurement. Example: 3.45 ± 0.3 should be reported as 3.4 ± 0.3. If you have questions about this, see your instructor.
- Pay attention to consistent formatting for both in-text citations and in the reference list. Be sure to manually double check that the reference list and text (including figure and tables) have the exact same references.

REVIEW SAFETY FEATURES IN THE LAB (REIC 245)

- x Cubbies for bags and coats
- x Location of personal protective equipment (PPE)
- x Safety shower/eyewashes
- x Fume hoods
- x Exits out t

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Tentative Schedule (version 1-9-2020)

Date		Monday Lecture	Monday Lab	Wednesday Lab
1-13	1			