CH 4212
Laboratory Syllabus
Fall Semester, 2003

Format: This semester I continue to try a radical departure from the lab format that you and I are both familiar with. We are going to follow the role-playing model for analytical laboratories that has been so successful at St. Olaf College in Minnesota (1–3). I encourage you to read these references to get a feeling for how this process works. I am going to modify it somewhat to fit our department facilities and your previous coursework.

This pedagogical model is designed to foster teamwork and independence. Basically, each lab section becomes an independent company specializing in chemical analysis. I will assign four roles to individual responsibilities are defined in Reference 1 as follows: “Manager is responsible for the organization and outcome of the experiment.”

Chemist is responsible for the preparation, blending, and delivery, in the right place and time and in the right chemical form, of all the reagents and analytical standards needed to implement Manager’s plan of execution of the experiment.

Hardware is responsible for the assembly and operation of all of the instrumentation needed to implement Manager’s plan of execution of the experiment.

Software is responsible for the creation, linking, or operation of any software that Manager, Chemist or Hardware needs to make Manager’s plan of execution work. Software is also responsible for telecommunications programs used for file transfer.”

These roles will rotate each time a new project is initiated (approximately every 2–3 weeks). Thus, everyone will have to function as Manager, Hardware, etc. during the course of the semester.

Grading:

Everyone has to submit an independent lab report for each project. Your grade for each project is dependent on the lab data and interpreted results (submitted electronically), and the summary report submitted by email from Manager to Upper Management.

Schedule:

Weeks 1 – 2
- Instrumentation electronics

Week 3
- Individual lab practicum scheduled (covering electronics)

Weeks 4 – 5
- Project 1: Phenols by Gas Chromatography

Weeks 6 – 7
- Project 2: Lead by Atomic Absorption

Weeks 8 – 9
- Project 3: Determination of caffeine and benzoate in Soda Pop by HPLC

Weeks 10 – 11
- Project 4: Production of a “perfect” isosbestic point by UV-vis spectrophotometry
Weeks 11 – 12  Project 5: Monitoring of an esterification reaction by FTIR
Weeks 13 – 14  Project 6: Analysis of Complex Mixtures by Gas Chromatography - Mass Spectrometry (GC-MS)

Projects are to be determined by class participants one week prior to scheduled start.

References