NAME: _____ CPO: _____

Chemistry Portfolio

(Revised August 30th, 2006)

Welcome to the Chemistry Program at Berea College! We are delighted to have the opportunity to work with you as you learn more about chemistry. To complete your chemistry major requires that you meet acceptable levels of performance in the classroom and in the laboratory. In addition, you must be able to communicate scientific ideas to others. We'll provide you with opportunities to learn the basics of chemistry, with opportunities to use state of the art instrumentation, with opportunities to do research, and with opportunities to attend scientific meetings to present the results of your research.

We have many requirements to help shape you into what we believe will be a good chemist. To help you keep track of and on track meeting these requirements, we have assembled this check sheet that you are responsible for. You will need to ensure that your requirements are met. Faculty will check your progress each semester in the advanced laboratory sequence. Poor progress in meeting portfolio requirements will result in a grade of "I" being assigned for the particular advanced laboratory course in which you are enrolled.

Keep your portfolio up to date!

Laboratory Proficiencies

Your progress in the ADVANCED LABORATORY course will be monitored using your laboratory notebooks and your portfolio. Each student is required to successfully complete 20 experiments from the approved list. You will decide what experiments you will do each semester. The portfolio guidelines will assist you in choosing each semesters work. The 20 experiments are spread over five chemistry disciplines and will use a variety of instrumental techniques. For an experiment to be used in meeting a portfolio requirement it must be adequately documented in your laboratory notebook and the write-up for the laboratory must receive a grade of "C" or higher.

In addition to completing 20 experiments, students must demonstrate an understanding of the various types of instrumentation within the Department. Students will also take standardized examinations relating to the instrumentation used in each experiment and must achieve a specified score. Examinations must be repeated until a satisfactory score is obtained. Also, the student must demonstrate a practical working knowledge of the instrument in question. These examinations will be developed throughout the coming year.

Approval:

_____, Chair of the Department of Chemistry finds that

_____ has met the requirements of the Chemistry Portfolio required for graduation. Date: _____.

Seminar Checklist

A minimum of 12 ACS (or other approved) seminars attended. It is suggested that these be spread out over the last four semesters of work at Berea.

	Speaker	Title	Date/ Faculty Signature
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			

PROFICIENCY EXAM- All chemistry majors must pass a proficiency exam during their senior year. Students must score at or above the 75th percentile on the American Chemical Society (ACS) Introductory Chemistry Examination. This exam will be offered twice each semester and must be repeated until a satisfactory score is achieved. Students failing to obtain the required score will receive a grade of "I" in CHM 471.

Date_____ %ile _____ Examination _____ Faculty Signature _____

Other attempts: _____

Oral Presentations

A minimum of two formal oral presentations (one must be an oral presentation as opposed to a poster presentation) given on your undergraduate research project. One presentation must occur at a meeting outside of Berea. Examples of suitable venues include, but are not limited to, meetings of the Kentucky Academy of Sciences, the American Chemical Society, or the National Council of Undergraduate Research. A minimum of four additional oral presentations in conjunction with advanced chemistry courses (in the form of a poster/talk/seminar) are also required. Poor presentations will not be awarded credit- see the evaluation sheet for details of proficiency levels.

Date/Venue (formal)	**Title**	**Faculty Signature**

Date/Venue (Advanced LAB)	**Title**	**Faculty Signature**

Faculty comments on oral presentations:

Important Papers in Chemistry

You must read and discuss with your advanced laboratory instructor a minimum of 4 key papers from a list of the most frequently cited papers in chemistry. Normally you should read/discuss one per advanced laboratory course.

Author	Title	Date/Faculty Signature

Faculty comments on discussions:

1)

2)

3)

4)

Laboratory Experiments/Proficiency Index

Instrumentation Checklist

SPECTROSCOPY (competence in 4 of 6 areas, one area must be NMR)

1) Nuclear Magnetic Resonance Spectroscopy (6 of the following)

One-Dimensional Experiments	^{1}H ____	^{13}C _____	APT _____
Two-Dimensional Experiments	COSY _____	NOESY _____	HMQC _____
Multi-Nuclear Experiments	^{31}P _____	^{11}B/^{2}H/^{27}Al _____	Other _____

NMR WRITTEN EXAMINATION:
Date _____ Score _____ Faculty _____ Proficiency achieved _____

2) Fourier Transform IR Spectroscopy
ATR _____ Diffuse Reflectance _____Thin Film _____

3) UV/Visible Spectroscopy
Frequency Resolved _____ Time Resolved _____

4) Flame Atomic Absorption Spectroscopy
Air/Acetylene Flame ____Nitrous Oxide Flame ____

5) Fluorescence
Excitation Resolved _____ Emission Resolved _____

SPECTROSCOPY WRITTEN EXAMINATION:
Date _____ Score _____ Faculty _____ Proficiency achieved _____

CHROMATOGRAPHY (competence shown in two of three areas)

1) Gas Chromatography Capillary Column _____ GC/MS _____ Wide Bore Column ____

2) Low Pressure Liquid Organic Solvent _____ Aqueous Solvent _____

3) High Performance Liquid Reverse Phase _____ Ion Exchange _____

CHROMATOGRAPHYWRITTEN EXAMINATION:
Date _____ Score _____ Faculty _____ Proficiency achieved _____

SPECIAL TOPIC (_____)

1) Description of topic and instrumental techniques

SPECIAL TOPIC WRITTEN EXAMINATION:

Date _____ Score _____ Faculty _____ Proficiency achieved _____

COMPUTATIONAL TOOLS (competence with at least six applications)

Microsoft Windows _____	Macintosh OS _____	LINUX _____
Excel _____	Word _____	Statview _____
Powerpoint _____	Maple/Mathematica _____	Cricket Graph _____
Gaussian 98 _____	Crystal 98 _____	ChemOffice _____
Kaleidograph _____		

VACUUM LINE

Oral examination: Topic _____ Date _____ Score _____ Faculty _____ Proficiency achieved _____

Experiment Checklist (20 experiments are required)

Organic Chemistry (must perform at least 3 experiments/ 2 must be multi-step syntheses)

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Physical Chemistry (must choose at least six from the approved list/2 in each of the following areas)

Kinetics

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Thermodynamics

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Quantum Chemistry

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Inorganic Chemistry (must perform three inorganic experiments/ at least one advanced)

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Biochemistry (must perform four biochemistry experiments/two basic/two advanced)

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Analytical Chemistry (must perform two analytical experiments)

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Other experiments (must perform two other experiments in areas of your choosing)

Experiment _____ Course _____ Faculty Signature _____

Experiment _____ Course _____ Faculty Signature _____

Chemistry Department Oral Communication Evaluation Form. Students must attain a rating of "proficient" in order for the presentation to count towards the portfolio requirement.

Student's Name _____ Date _____

Venue_____ Evaluator _____

Each of the following should be rated as being at a *distinguished,* D, *proficient,* P, *apprentice,* A, or *novice*, N level. The attached form describes these ratings.

Communication Skill Assessment

A. Presence- (voice, pace, eye contact, confidence, body language) _____

B. Use of supplementary material- (chalkboards, handouts, overheads) _____

C. Clarity of talk - (outline, organization, conclusion, appropriate for audience) _____

D. Response to questions- _____

General Comments

Specific Recommendations for Communication Skill Improvement

Technical Assessment

A. Understanding of material _____

B. Explanation of material (appropriate for level of audience, educational) _____

C. Substance- (technically correct) _____

D. Response to questions _____

General Comments

Specific Recommendations for Improving Technical Content

Overall Rating of Presentation

Distinguished _____ Proficient _____ Apprentice _____ Novice _____

Explanation of Rating Scale

Distinguished- The oral communication skills of the student are nearly perfect. The presentation was well-rehearsed with an exceptionally clear thesis and outline. Appropriate use has been made of supplementary material- writing on the chalkboard or overheads is legible, handouts add significantly to the presentation. Voice projection and the pace of the presentation are fine. Technically, the students has taken the material beyond a mere literature review or research summary by adding additional interpretation or making comparisons not present in the original literature.

Proficient - The oral skills of the student are at an acceptable level. Appropriate use has been made of supplementary material- writing on the chalkboard or overheads is legible, handouts add significantly to the presentation. Voice projection and the pace of the presentation are fine. The only minor errors that are present could be improved through additional practice. NO technical errors are present. The student has presented the reviewed material concisely, accurately, and at an appropriate level for the audience.

Apprentice - Key features of oral communication are evident, but capable of additional development. No more than one major flaw is contained in the presentation such as lack of voice projection, poor overhead usage, inappropriate body language, poor quality of supplementary material. The thesis and outline of the talk are obvious. Technically the presentation contains few flaws, however, the material is still not quite understandable at the level of the audience. Understanding could be improved through the use of more appropriate supplementary material, simplification of diagrams and figures, or by spending more time explaining each figure. It is apparent that the student has some understanding of the material.

Novice - Essential elements of effective oral communication are not evident. Poor grammar is evident throughout the presentation as shown through poor word choice, sentence structure, and pronunciation problems. No thesis or outline is apparent. Communication aids are not used effectively and are more of a hindrance than a help. The use of a chalkboard, overheads, or other auxiliary material is very awkward. Technically, the report contains numerous scientific errors showing some misunderstanding of the project. The purpose of the research is not evident and is not presented on a level understandable by the audience.