

**RESEARCH CONTRACT: BCHM 350 – LIBRARY RESEARCH**

Students working on a library research project are obliged to conform to the following expectations:

1. Establish work habits that include a minimum of four hours per cycle of library research for each term credit earned.
2. Meet with the moderator on a regular basis to discuss progress made on the project (once per cycle).
3. Maintain literature sources, reading notes, etc. which should be available to the moderator during the meetings and upon request.
4. Prepare and present a Senior Seminar talk.
5. Submit a formally prepared and properly referenced paper.
6. Read and discuss Grading Rubric with faculty advisor at the start of the project.

The faculty research advisor agrees to commit at least one hour per cycle for direct interaction and guidance.

This contract is mutually agreed upon by

Advisee \_\_\_\_\_ Research Advisor \_\_\_\_\_ Date \_\_\_\_\_

**Library Research Proposal**

Name \_\_\_\_\_ Research Advisor \_\_\_\_\_

Term/Year \_\_\_\_\_ Number of Credits \_\_\_\_\_

Please print or type a short description of projected library research activity.

Student Signature \_\_\_\_\_ Research Advisor Signature \_\_\_\_\_ Date \_\_\_\_\_

## RESEARCH CONTRACT: BCHM 351 – LAB RESEARCH

Students working on laboratory research projects are obliged to conform to the following expectations:

1. Establish work habits that include a minimum of four hours per cycle of laboratory research for each term credit earned.
2. Meet with the moderator on a regular basis to discuss progress made on the project (once per cycle).
3. Maintain a complete notebook which should include dates, descriptions of experiments, data, literature sources, reading notes, etc. and should be available to the moderator during the meetings and upon request.
4. Prepare and present a Senior Seminar talk.
5. For a laboratory research project, each student must submit a formally prepared and properly referenced paper describing the project and results.
6. Read and discuss Grading Rubric with faculty advisor at the start of the project.
7. At the completion of the project, put work areas back in order, and put away or dispose of chemicals and equipment in the proper manner.

The faculty research advisor agrees to commit at least one hour per cycle for direct interaction and guidance.

This contract is mutually agreed upon by

Advisee \_\_\_\_\_ Research Advisor \_\_\_\_\_ Date \_\_\_\_\_

### Laboratory Research Proposal

Name \_\_\_\_\_ Research Advisor \_\_\_\_\_ Term/Year \_\_\_\_\_

Number of Credits Fall term \_\_\_\_\_ Number of Credits Spring term \_\_\_\_\_

Please print or type a short description of projected laboratory research activity.

Student Signature \_\_\_\_\_ Research Advisor Signature \_\_\_\_\_ Date \_\_\_\_\_

STUDENT: \_\_\_\_\_

BCHM 350 \_\_\_\_\_

BCHM 351 \_\_\_\_\_

| This component, evaluated by the student's research advisor, is based on the student's presentation. The following criteria will be used to determine this grade: | Not Applicable (NA) | Excellent (4pts) | Above Avg (3pts) | Average (2pts) | Below Avg (1pt) | Poor (0pt) | Score = |
|---|---------------------|------------------|------------------|----------------|-----------------|------------|---------|
| <b>SCIENCE CONTENT</b>  |                     |                  |                  |                |                 |            |         |
| Accuracy of scientific information presented. Information used in the presentation is consistently accurate.  |                     |                  |                  |                |                 |            |         |
| Depth of science content. Detailed explanation of key concepts/theories. Competent in understanding of scientific concepts  |                     |                  |                  |                |                 |            |         |
| Appropriate display and interpretation of data. Conclusions consistent with data  |                     |                  |                  |                |                 |            |         |
| Ability to answer questions   |                     |                  |                  |                |                 |            |         |
| Describes logical and relevant follow-up experiments  |                     |                  |                  |                |                 |            |         |
| <b>CLARITY OF PRESENTATION</b>  |                     |                  |                  |                |                 |            |         |
| Abstract follows requirements and reflects actual research/presentation   |                     |                  |                  |                |                 |            |         |
| Clear thesis and summary  |                     |                  |                  |                |                 |            |         |
| Presentation is clear, logical, and well-organized.   |                     |                  |                  |                |                 |            |         |
| Visual Aids enhance presentation. Font size and amount of detail appropriate. Graphics relevant. No distracting or inappropriate visuals                          |                     |                  |                  |                |                 |            |         |
| <b>DELIVERY OF PRESENTATION</b>   |                     |                  |                  |                |                 |            |         |
| Good pronunciation, enunciation, and articulation enhance the message. No grammatical errors. Presentation is free from (sexist, racist, etc.) bias.              |                     |                  |                  |                |                 |            |         |

TOTAL RAW SCORE (40 pt max excluding NA): \_\_\_\_\_ TOTAL SECTION % (100 % max) = \_\_\_\_\_% SCALED SECTION % (15-25%) = \_\_\_\_\_%

STUDENT: \_\_\_\_\_

BCHM 350 \_\_\_\_\_

BCHM 351 \_\_\_\_\_

| This component is determined by the paper written by the student. The student's research advisor will determine this grade based on the following criteria:   | Not Applicable (NA)  | Excellent (4pts) | Above Avg (3pts) | Average (2pts) | Below Avg (1pt) | Poor (0pt) | Score = |
|---|----------------------|------------------|------------------|----------------|-----------------|------------|---------|
| <b>SCIENCE CONTENT</b>  |                      |                  |                  |                |                 |            |         |
| <b>Introduction:</b> Clear thesis and purpose. Appropriate location and review of the relevant literature   |                      |                  |                  |                |                 |            |         |
| <b>Materials and Methods:</b> Experiment addresses hypothesis. Hypothesis testable. Design clearly stated and easy to follow, in past tense. Design appropriate to obtain results. Experimental conditions well thought out. Clear use and understanding of controls. | Usually for 351 only |                  |                  |                |                 |            |         |
| <b>Data/Results:</b> Appropriate measurements taken. Well designed data sheet, tables, and/or graphs. Recorded clearly with brief narrative. Appropriate use of statistical analyses.   |                      |                  |                  |                |                 |            |         |
| <b>Figures:</b> Appropriate use of figures. Appropriate citation of figures copied from references. Figures created by students when possible..   |                      |                  |                  |                |                 |            |         |
| <b>Discussion:</b> Data analysis indicates understanding of relationship to thesis. Substantial, logical, & concrete development of ideas. Assumptions are made explicit. Conclusions supported by data.  |                      |                  |                  |                |                 |            |         |
| <b>References:</b> Appropriate location, number and use of references.  |                      |                  |                  |                |                 |            |         |
| <b>QUALITY OF WRITING</b>   |                      |                  |                  |                |                 |            |         |
| <b>Writing Effort:</b> Evaluation of at least one draft. Final paper reflects suggested changes in draft(s). Minimum length with references of 8 – 10 pages.  |                      |                  |                  |                |                 |            |         |
| <b>Logical and Clear:</b> Sections flow into each other with obvious and logical connection. Reader has no trouble following ideas.   |                      |                  |                  |                |                 |            |         |
| <b>Format and Grammar:</b> Title page w/ Name, date, and lab labeled correctly. Abstract present and appropriate. Appropriate sections.   |                      |                  |                  |                |                 |            |         |
| <b>Grammar:</b> No spelling errors. All sentences grammatically correct   |                      |                  |                  |                |                 |            |         |

TOTAL RAW SCORE (40 pt max excluding NA): \_\_\_\_\_ TOTAL SECTION % (100 % max) = \_\_\_\_\_% SCALED SECTION % (15-25%) = \_\_\_\_\_%

BCHM 350, 351 GRADING RUBRIC – **RESEARCH:** 50-70% Final Grade **ACTUAL %** \_\_\_\_\_

STUDENT: \_\_\_\_\_

BCHM 350 \_\_\_\_\_

BCHM 351 \_\_\_\_\_

| This component reflects the student's quality and quantity of work, and how well the student has met established deadlines for completion of the research project and will include the following | Not Applicable (NA) | Excellent (4pts) | Above Avg (3pts) | Average (2pts) | Below Avg (1pt) | Poor (0pt)  | Score =       |         |
|--|---------------------|------------------|------------------|----------------|-----------------|-------------|---------------|---------|
| <b>QUALITIES OF RESEARCH</b>   |                     |                  |                  |                |                 |             |               |         |
| <b>Effort:</b> How much work did the student do to make the project a success?   |                     |                  |                  |                |                 |             |               |         |
| <b>Meetings:</b> Did the student meet regularly with the research advisor?   |                     |                  |                  |                |                 |             |               |         |
| <b>Preparation:</b> how well was the student prepared for each meeting with the advisor?   |                     |                  |                  |                |                 |             |               |         |
| <b>Attitude, Enthusiasm:</b> How engaged was the student in the entire project, including conducting research, writing the final paper.  |                     |                  |                  |                |                 |             |               |         |
| <b>Independence:</b> How well did the student read/interpret the literature (350, 351) and design and interpret experiments (351) on their own?  |                     |                  |                  |                |                 |             |               |         |
| <b>Fall research effort:</b> Did the student do research regularly during the fall semester of their senior year? (Not applicable if studied abroad)   |                     |                  |                  |                |                 |             |               |         |
| <b>Spring research effort :</b> Did the student work on their research regularly during the spring semester of their senior year?  |                     |                  |                  |                |                 |             |               |         |
| <b>BONUS PTS - External Presentations :</b> Did the student present their research at a regional or national meeting?  |                     |                  |                  |                |                 |             |               |         |
| <b>DEADLINES</b>   |                     |                  |                  |                |                 |             |               |         |
| This component reflects how well the student has met established deadlines for completion of the research project, apply to the following tasks  | Not Applicable      |                  |                  |                |                 | Met (1 pts) | Unmet (0 pts) | Score = |
| Selection of a research advisor and project  |                     |                  |                  |                |                 |             |               |         |
| Submission of an abstract (approved by the research advisor)   |                     |                  |                  |                |                 |             |               |         |
| Submission of initial paper draft  |                     |                  |                  |                |                 |             |               |         |
| Submission of spectra/data and notebook(s) to research advisor   | For 351             |                  |                  |                |                 |             |               |         |
| Lab cleaned on end of research   | For 351             |                  |                  |                |                 |             |               |         |

TOTAL RAW SCORE(33 pt max excluding NA): \_\_\_\_\_ TOTAL SECTION % (100 % max) = \_\_\_\_\_% SCALED SECTION % (50-75%) = \_\_\_\_\_%

**FINAL GRADE CALCULATIONS**

COMBINED SCORES: \_\_\_\_\_% presentation + \_\_\_\_\_% final paper + \_\_\_\_\_% research = \_\_\_\_\_%  
(15-25%) (15-25%) (50-70%) (100%)

| GRADE | GRADE CUTOFFS |
|-------|---------------|
| A     | 90            |
| AB    | 85            |
| B     | 80            |
| BC    | 75            |
| C     | 70            |
| CD    | 65            |
| D     | 60            |
| F     | 55            |

FINAL LETTER GRADE: \_\_\_\_

