

Colorado State University – Department of Chemistry
BS/MS in Chemistry – Spring 2013

Summary

The accelerated B.S./M.S. program offers a mechanism whereby highly motivated students can fulfill the requirements of an ACS-certified B.S. Chemistry degree and a Plan A or Plan B M.S. Chemistry degree in five years. Students making satisfactory progress towards the B.S. Chemistry degree may enroll in this program upon completion of the prerequisite coursework described below. For most students, this will occur after the fall semester of their junior year. Upon completion these requirements, students will enroll in the graduate program via Track III admission, and upon satisfactory completion of all graduate and undergraduate degree requirements, will be awarded a combined B.S./M.S. degree. To be eligible for admission to the B.S./M.S. program, a student must have a minimum 3.0 GPA, and must have completed at least 75 credit hours, of which 15 must be upper division (300+) credits. Also, the student must complete the following coursework (or equivalent transfer courses) prior to admission to the B.S./M.S. program: CHEM 111 (or 117 and 192), 112, 113, 114; MATH 160, 161; PH 141, 142; CHEM 334 and 335; CHEM 345 and 346 (or 341, 343, and 344); and CHEM 474 and 475. This required coursework must be completed with cumulative GPA of 3.0 or above.

Elements of the Program

- The minimum requirements for admission to the B.S./M.S. program in Chemistry are
 - + completion of at least 75 credits hours, of which at least 15 credits must be from upper division (300+) courses
 - + a cumulative GPA of 3.0 or above
 - + completion of the following courses (or equivalent transfer courses) with a cumulative GPA of 3.0 in these courses: CHEM 111 (or 117 and 192), 112, 113, 114; MATH 160, 161; PH 141, 142; CHEM 334 and 335; CHEM 345 and 346 (or 341, 343, and 344); and CHEM 474 and 475. These requirements will typically be fulfilled after the first semester of the Junior year (See the attached course schedule). Students are encouraged to enroll in the program in the second semester of their Junior year to receive the full benefit of the program. Students may enroll in the program at any time through the last semester of their senior year or until 120 credits have been completed.
- To apply to the program, students will submit a standard application to the Graduate School (via Track III), without the requirement for GRE scores. An admission decision will be made by the Chemistry Department Graduate Admissions Committee in the semester the application was received.
- Students are encouraged to begin the application process during the semester before their enrollment in the program. For example, a student following the course schedule outlined below would apply to the B.S./M.S. program during the first semester of their junior year.
- As part of the application process, each student will receive a list of faculty interested in serving as research advisor to B.S./M.S. students, as well as information about available research projects in each lab. Students will then interview at least three of these faculty, after which they will select a faculty member who will serve as their B.S./M.S. research advisor. Selection of an advisor is a prerequisite for admission into the B.S./M.S. program.
- Upon admission to the program, the student will be assigned a graduate committee consisting of their faculty research advisor, two additional Chemistry faculty, and one faculty member from a different department.
- Students will complete all remaining coursework toward the completion of an ACS certified B.S. degree in Chemistry while they are enrolled in the B.S./M.S. program (See attached sample schedule). During their senior year, students making satisfactory progress may receive advanced placement in one or more graduate level (500+) courses. These courses may be used to fulfill upper division science electives toward the B.S. degree and/or may be used to fulfill coursework requirements in the M.S. program.
- Upon completion of all undergraduate degree requirements, students will be awarded their B.S. degree in Chemistry. Students may opt out of the B.S./M.S. program at any time with no penalty.

- Each student must complete a GS6 (Program of Study) form during the first semester after completion of their undergraduate degree requirements as well as the Exclusion form. The advisor will assist in the completion of these forms. At this point, the student will decide whether they plan to work toward an M.S. degree under Plan A or Plan B.
- An important element of the B.S./M.S. program is the independent research component. Students will begin working on an independent research project under their advisor's supervision during their first semester in the B.S./M.S. program. This research will serve as the basis for the student's M.S. thesis or other scholarly work in fulfillment of the M.S. degree, depending on whether the student completes the Plan A or Plan B M.S. program. Credit may be received for this research effort by enrolling in CHEM 498 (Research) prior to completing the undergraduate degree requirements. These research credits may be used to fulfill upper division science electives towards the B.S. degree. It is expected that students will complete at least 3-credits of CHEM 498 for each semester they are enrolled in the B.S./M.S. program prior to the completion of their undergraduate degree requirements. After the undergraduate degree requirements have been completed, students will continue pursuing their research as M.S. students. Credit for this research at the M.S. level will be received by enrolling in CHEM 698 (Research) or CHEM 699 (Thesis), depending on whether the student is pursuing a Plan A or Plan B M.S. degree.
- The Plan A and Plan B M.S. program coursework requirements for students enrolled in the B.S./M.S. program are attached below. Students may complete some of this coursework during the senior year of their undergraduate program. The remaining coursework will be completed while the student is enrolled in the graduate program (See attached sample schedule).
- Additional requirements for the Plan A and Plan B M.S. degree are outlined below. These include cumulative exams and the completion of a thesis or other scholarly work. Students in the B.S./M.S. program have the option of completing some or all of their cumulative exam requirements while they are still completing undergraduate degree requirements. The thesis or other scholarly work requirement will be completed during the student's final semester in the B.S./M.S. program. This requirement should be based on the independent research project the students have worked on throughout the program.
- To remain in the B.S./M.S. program, students must maintain a cumulative GPA of 3.0 or above.

M.S. Requirements for B.S./M.S. Students

| Plan A | | Plan B | |
|--|------------|--|------------|
| | Cr | | Cr |
| Graduate Courses in Chemistry and other disciplines (See approved list) | 12-15 | Graduate Courses in Chemistry and other disciplines (See approved list) | 12-15 |
| CHEM 699 ¹ (Thesis) | 10 | CHEM 698 ¹ (Research) | 10 |
| CHEM 793 (Seminar) | 2 | CHEM 793 (Seminar) | 2 |
| Electives ² | <u>3-6</u> | Electives ² | <u>3-6</u> |
| TOTAL | 30 | TOTAL | 30 |
| <p>Additional Requirements:</p> <p>I. Students must pass two cumulative exams or the equivalent,³ which are given monthly 9 times per year, in no more than 12 attempts. Students may complete this requirement at any time during their enrollment in the B.S./M.S. program.</p> <p>II. Students must complete a faculty refereed scientific presentation. Students may fulfill this requirement in one of two ways:</p> <p style="padding-left: 20px;">A. Students may give a public seminar based on the scientific literature.</p> <p style="padding-left: 20px;">B. Students may give a public seminar based on their thesis research.</p> <p>III. Students must write and defend a thesis based on their B.S./M.S. research conducted at CSU; this thesis must be judged to be properly formatted by the Graduate School.</p> | | <p>Additional Requirements:</p> <p>I. Students must pass two cumulative exams or the equivalent,³ which are given monthly 9 times per year, in no more than 12 attempts. Students may complete this requirement at any time during their enrollment in the B.S./M.S. program.</p> <p>II. Students must complete a faculty refereed scientific work. Students may fulfill this requirement in one of two ways:</p> <p style="padding-left: 20px;">A. Students may give a public seminar based on the scientific literature in the field of their M.S. degree research.</p> <p style="padding-left: 20px;">B. Students may give a public seminar based on their M.S. degree research.</p> | |
| <p>¹Up to 7 credits of CHEM 699 may be satisfied by CHEM 698.</p> <p>²Electives may include additional coursework from the approved list; CHEM 698 (Research); additional credits of CHEM 699; up to 2 additional CHEM 793 (Seminar) credits; CHEM 751 (Methods of Chemistry Laboratory Instruction; or CHEM 784 (Supervised College Teaching).</p> <p>³See instructions from the Chemistry Department website http://www.chem.colostate.edu/green_book.html.</p> | | <p>¹Up to 10 credits of CHEM 698 may be satisfied by CHEM 699.</p> <p>²Electives may include additional courses from the approved list; additional credits of CHEM 698; CHEM 699 (Thesis); up to 2 additional CHEM 793 (Seminar) credits; CHEM 751 (Methods of Chemistry Laboratory Instruction; or CHEM 784 (Supervised College Teaching).</p> <p>³See instructions from the Chemistry Department website http://www.chem.colostate.edu/green_book.html.</p> | |

Example 5-Year Program for the Accelerated B.S./M.S. Chemistry Degree

FRESHMAN

| Course | Course Title | Cr |
|-----------------------|---|-----------|
| CHEM 111 OR | General Chemistry I OR | 4 |
| CHEM 117 CHEM 192 | General Chemistry I for Chemistry Majors Introductory Seminar in Chemistry | 3 1 |
| CHEM 112 | General Chemistry Laboratory I | 1 |
| CHEM 113 | General Chemistry II | 3 |
| CHEM 114 | General Chemistry Laboratory II | 1 |
| CO 150 | College Composition | 3 |
| MATH 160 | Calculus for Physical Scientists I | 4 |
| MATH 161 | Calculus for Physical Scientists II | 4 |
| | Additional Communications | 3 |
| | Biological Sciences | 4 |
| | Electives | 4 |
| | Total Credits | 31 |
| | Total Upper Division (300+) Credits | 0 |

SOPHOMORE

| Course | Course Title | Cr |
|-----------------------|--|-----------|
| CHEM 261 | Fundamentals of Inorganic Chemistry | 3 |
| CHEM 345 | Organic Chemistry I | 4 |
| CHEM 346 | Organic Chemistry II | 4 |
| MATH 261 | Calculus for Physical Scientists III | 4 |
| PH 141 | Physics for Scientists and Engineers I | 5 |
| PH 142 | Physics for Scientists and Engineers II | 5 |
| STAT 301 OR | Introduction to Statistical Methods OR | 3 |
| STAT 315 | Statistics for Engineers and Scientists | 3 |
| | Arts/ Humanities | 3 |
| | Total Credits | 62 |
| | Total Upper Division (300+) Credits | 11 |

JUNIOR-SEMESTER 1

| Course | Course Title | Cr |
|----------|--|-----------|
| CHEM 334 | Quantitative Analysis Laboratory | 1 |
| CHEM 335 | Introduction to Analytical Chemistry | 3 |
| CHEM 474 | Physical Chemistry I | 3 |
| CHEM 475 | Physical Chemistry Laboratory I | 1 |
| | Arts/Humanities | 3 |
| | Global and Cultural Awareness | 3 |
| | Electives | 2 |
| | Total Credits | 81 |
| | Total Upper Division (300+) Credits | 19 |

JUNIOR-SEMESTER 2 (1st semester of the B.S./M.S. Program)

| Course | Course Title | Cr |
|----------|--|-----------|
| CHEM 476 | Physical Chemistry II | 3 |
| CHEM 477 | Physical Chemistry Laboratory II | 1 |
| CHEM 498 | Research | 3 |
| | Historical Perspectives | 3 |
| | Social/Behavioral Sciences | 3 |
| | Electives | 2 |
| | Total Credits | 96 |
| | Total Upper Division (300+) Credits | 26 |

SENIOR-SEMESTER 1 (2nd semester of the B.S./M.S. Program)

| Course | Course Title | Cr |
|---|--|------------|
| BC 351 | Principles of Biochemistry | 4 |
| OR BC 401 plus 1 additional elective credit | | 4 |
| CHEM 440 | Advanced Organic Chemistry Laboratory | 2 |
| CHEM 431 | Instrumental Analysis | 4 |
| CHEM 493 | Seminar | 2 |
| CHEM 498 | Research | 3 |
| | Total Credits | 111 |
| | Total Upper Division (300+) Credits | 41 |

SENIOR-SEMESTER 2 (3rd semester of the B.S./M.S. Program)

| Course | Course Title | Cr |
|----------|--|------------|
| CHEM 461 | Inorganic Chemistry | 3 |
| CHEM 462 | Inorganic Chemistry Laboratory | 2 |
| CHEM 498 | Research | 3 |
| CHEM 5xx | Graduate Course from the Approved List | 3 |
| | Electives | 3 |
| | Total Credits | 124 |
| | Total Upper Division (300+) Credits | 52 |
| | Total Graduate (500+) Credits | 3 |

M.S.-SEMESTER 1 (4th semester of the B.S./M.S. Program)

| Course | Course Title | Cr |
|-----------------------------------|---|-----------|
| CHEM 500+ | Graduate Courses from the Approved List | 6 |
| CHEM 698 OR CHEM 699 | Research Thesis | 5 5 |
| CHEM 793 | Seminar | 1 |
| | Electives | 1 |
| | Total Graduate (500+) Credits | 16 |

M.S.-SEMESTER 2 (5th semester of the B.S./M.S. Program)

| Course | Course Title | Cr |
|-----------------------------------|---|-----------|
| CHEM 500+ | Graduate Courses from the Approved List | 6 |
| CHEM 698 OR CHEM 699 | Research OR Thesis | 5 5 |
| CHEM 793 | Seminar | 1 |
| | Electives | 2 |
| | Total Graduate Credits | 30 |