

<b>Really Old Chemistry Major Students matriculating into Butler before Aug 2020</b>	<b>Old Chemistry Major Students matriculating into Butler Aug 2020 – July 2023</b>	<b>Current Chemistry Major Students matriculating into Butler after Aug 1, 2023</b>
<p><i>Required courses</i> CH105-6 (10 hours) or CH107 (6 hours) CH351-2 (10 or 8 hours)</p> <p><i>Required allied courses</i> MA106 PH107-8 or PH201-2</p> <p><i>Enough hours from list for a total of 32 hours of CH and at least two areas</i> CH331, CH431, CH433, CH439 - Inorganic Chemistry Courses CH321, CH422, CH424, CH425, CH429 - Analytical Chemistry Courses CH361 or CH362 (cannot count both), CH462, CH363, CH463, CH469 - Biological Chemistry Courses CH371, CH472, CH473, CH479 - Physical Chemistry Courses CH451, CH453, CH459 – Organic Chemistry CH408, CH418 – Societal Chemistry</p>	<p><i>Required courses and required allied courses</i> CH105-6 or CH107 General Chemistry (8/5 cr) CH351-2 Organic Chemistry 1 &amp; 2 (8 cr) MA106 Calculus 1 (4 cr) PH107 or PH201 Physics 1 (4/5 cr) PH108 or PH202 Physics 2 (4/5 cr)</p> <p><i>Three 300-level courses from the following list:</i> CH321 Analytical Chemistry CH331 Inorganic Chemistry CH361 <b>or</b> CH362 Biological Chemistry (cannot count both) CH371 Physical Chemistry</p> <p><i>One 400-level lecture course from the following list:</i> CH422 Analytical Chemistry 2 CH431 Inorganic Chemistry 2 CH451 Advanced Organic Chemistry CH462/CH464 Biochemistry 2 CH472 Physical Chemistry 2 CH4x9 Special Topics in Chemistry CH425 Environmental Chemistry</p> <p><i>One 400-level laboratory course from the following list:</i> CH 424 Instrumental Analysis Laboratory CH 433 Inorganic Chemistry Laboratory CH 453 Advanced Organic Chemistry Laboratory CH 463 Biochemistry Laboratory 2 CH 473 Physical Chemistry Laboratory</p> <p><i>One 400-level three hour societal topics course from the following list:</i> CH408 Chemistry in Our Lives CH418 Chemistry and Global Issues</p>	<p><i>Required allied courses</i> (16-18 cr from this group) MA106-7 Calculus 1 &amp; 2 (8 cr) PH107 or PH201 Physics 1 (4/5 cr) PH108 or PH202 Physics 2 (4/5 cr)</p> <p><i>Strictly Required CH courses</i> (26-29 cr from this group) CH190 Modern Issues in Chemistry (1 cr) CH105-6 or CH107 General Chemistry (5/8 cr) CH321 Analytical Chemistry (3 cr) CH331 Inorganic Chemistry (3 cr) CH351-2 Organic Chemistry 1 &amp; 2 (8 cr) CH361 Biochemistry 1 (3 cr) CH371 Physical Chemistry (3 cr)</p> <p><i>One 400-level CH lecture course from the following list: (3-5 cr from this group)</i> CH422 Analytical Chemistry 2 (3 cr) CH431 Advanced Inorganic Chemistry (3 cr) CH451 Advanced Organic Chemistry (3 cr) CH462/CH464 Biochemistry 2 (5 cr) CH472 Physical Chemistry 2 (3 cr) CH4x9 Special Topics in Chemistry (3 cr) CH425 Environmental Chemistry (3 cr)</p> <p><i>One 400-level CH laboratory course from the following list: (3 cr from this group)</i> CH 424 Instrumental Analysis Laboratory (3 cr) CH 433 Inorganic Chem Laboratory (3 cr) CH 453 Advcd Organic Chem Laboratory (3 cr) CH 463 Biochemistry Laboratory 2 (3 cr) CH 473 Physical Chem Laboratory (3 cr)</p> <p><i>One 400-level three hour societal topics course from the following list: (3 cr from this group)</i> CH408 Chemistry in Our Lives (3 cr) CH418 Chemistry and Global Issues (3 cr)</p>

## American Chemical Society Certification

Course Requirements	Laboratory Experience Required
<p><b>Introductory courses</b> CH105-6 or CH107 General Chemistry</p> <p><b>Allied courses</b> MA106-7 Calculus 1&amp;2 PH107-8 or PH201-2 Physics</p> <p><b>Five foundational courses from the following list:</b> CH321 Analytical Chemistry CH331 Inorganic Chemistry CH351 Organic Chemistry 1 CH361 <b>or</b> CH362 Biological Chemistry (<i>cannot count both</i>) CH371 Physical Chemistry</p> <p><b>Four in-depth course from the following list:</b> CH352 Organic Chemistry 2 CH422 Analytical Chemistry 2 CH425 Environmental Chemistry CH431 Advanced Inorganic Chemistry CH451 Advanced Organic Chemistry CH462 Biochemistry 2 CH472 Physical Chemistry 2 CH4x9 Special Topics in Chemistry</p>	<p><b>350 laboratory hours spread across four of the following five areas:</b></p> <ol style="list-style-type: none"> <li>1) Analytical Chemistry courses with labs: CH321 (42/400 lab hours) CH424 (56/400 lab hours)</li> <li>2) Biological Chemistry courses with labs: CH363 (42/400 lab hours) CH463 (56/400 lab hours)</li> <li>3) Inorganic Chemistry courses with labs: CH433 (56/400 lab hours)</li> <li>4) Organic Chemistry courses with labs: CH351 (42/400 lab hours) CH352 (42/400 lab hours) CH453 (56/400 lab hours)</li> <li>5) Physical Chemistry courses with labs: CH473 (56/400 lab hours) (may be repeatable)</li> </ol> <p>Other Laboratory Research (up to 130/350 lab hours): (area depends on expertise of the supervising faculty member) (any research experience from this category must be documented with a final report*) CH493 (42/400 lab hours for each semester enrolled) CH494 (84/400 lab hours for each semester enrolled) Non-credit Summer research**</p>

\*A student using CH493/4 research to meet the ACS-certification requirements must prepare a well written, comprehensive, and well-documented research report, including safety considerations where appropriate. Thorough and current references to peer-reviewed literature play a critical role in establishing the overall scholarship of the report. One report is required per research project (i.e. only one report is required for an ongoing project pursued over multiple semesters). A completed honors thesis can qualify as this report. No presentations (oral, poster) nor journal article co-authorship substitute for the student writing a comprehensive report. Non-thesis reports should be prepared as part of CH411 independent study credit under the faculty mentor.

\*\* Students pursuing Summer research under the direction of a Butler Chemistry and Biochemistry faculty member can fold that research into a CH411 report or honors thesis (CH499). Students pursuing Summer research outside of the department must 1) have a faculty member of the Chemistry and Biochemistry department with subdiscipline-specific expertise certify that the research should count in one of the five fundamental areas defined above. The student should complete either a thesis advised by that faculty member, or complete the above report as part of CH411 under that faculty member.