Ph.D. Requirements in Chemistry

The minimum course requirements for the Ph.D. degree in chemistry are given below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 509 - Seminar</td>
<td>2</td>
</tr>
<tr>
<td><strong>Major core sequence</strong></td>
<td>9 (see major)</td>
</tr>
<tr>
<td>Breadth electives</td>
<td>6 (see major)</td>
</tr>
<tr>
<td>Elective from 500 series chemistry courses</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Chem 599 - Research</td>
<td>67</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>90</td>
</tr>
</tbody>
</table>

All students are also required to take Chem 455 and Chem 388 if equivalent courses have not been taken previously.

Specific requirements for a major in each division are given below, and must be approved by student’s committee.

**Ph.D. - Analytical Chemistry**

Major core sequence:
- Chem 540 Chemical Instrumentation 3
- two of the following three courses:
  - Chem 541 Analytical Spectroscopy 3
  - Chem 542 Electrochemical Methods 3
  - Chem 543 Chromatography 3
- Breadth Electives from 500 level Chemistry courses - must be taken in two divisions other than the major 6

**Ph.D. - Inorganic Chemistry**

Major core sequence:
- Chem 510 Intermediate Inorganic Chemistry 3
- Chem 511 Advanced Inorganic Chemistry 3
- Chem 512 Organometallic Chemistry 3
- Breadth Electives from 500 level Chemistry courses - must be taken in two divisions other than the major 6

**Ph.D. - Organic Chemistry**

Major core sequence:
- Chem 520 Advanced Organic Chemistry I 3
- Chem 521 Advanced Organic Chemistry II 3
- Chem 522 Advanced Organic Chemistry III 3
- Breadth Electives from 500 level Chemistry courses - must be taken in two divisions other than the major 6

**Ph.D. - Physical Chemistry**

Major core sequence:
- Chem 530 Chemical Thermodynamics 3
- Chem 531 Chemical Dynamics 3
- Chem 532 Introduction to Molecular Structure and Spectroscopy 3
- Breadth Electives from 500 level Chemistry courses - must be taken in two divisions other than the major 6