Chemistry, B.S.

Learn more about the Bachelor of Science in Chemistry.

The Bachelor of Science in Chemistry prepares students for excellence in graduate or medical school, and employment in the chemical, biotechnological, or pharmaceutical industries. Students learn a wide array of topics in Chemistry, Mathematics, and Physics. The program emphasizes the "hands-on" nature of chemistry in laboratory courses, giving students the tools that chemists need to pursue research. They also learn how to write scientific reports, analyze data, and place these results in a broader scientific context. Accomplished majors are encouraged to pursue independent research with a professor, and to present their work internally and at national meetings.

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vladi.wilent@temple.edu

Bachelor of Science

Summary of Requirements for the Degree

1. University Requirements (123 total s.h.)
   - Students must complete all University requirements including those listed below.
   - All Temple students must take a minimum of two writing-intensive courses at Temple as part of their major. The specific writing-intensive course options for this major are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 2296</td>
<td>Genetics (S)</td>
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<tr>
<td>BIOL 3096</td>
<td>Cell Structure and Function (F)</td>
<td></td>
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<tr>
<td>BIOL 3396</td>
<td>Scientific Writing for Biology: The Art of Communicating</td>
<td></td>
</tr>
<tr>
<td>CHEM 4196</td>
<td>Techniques of Chemical Measurement II</td>
<td></td>
</tr>
<tr>
<td>CHEM 3397</td>
<td>Physical Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td>&amp; CHEM 3398</td>
<td>Physical Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td>EES 2096</td>
<td>Climate Change: Oceans To Atmosphere (S - even years)</td>
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<tr>
<td>MATH 3098</td>
<td>Modern Algebra (F)</td>
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</table>
2. **Chemistry, B.S.**

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tr>
<td>MATH 4096</td>
<td>Senior Problem Solving</td>
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<tr>
<td>PHYS 2796</td>
<td>Introduction to Modern Physics (S)</td>
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</tr>
<tr>
<td>or PHYS 4796</td>
<td>Experimental Physics</td>
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</table>

- Students must complete the General Education (GenEd) requirements.
  - See the General Education section of the Undergraduate Bulletin for the GenEd curriculum.
  - Students who complete CST majors receive a waiver for 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
  - Students must satisfy general Temple University residency requirements.

2. **College Requirements**

- 45 Upper Level (2000+) credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), or the College of Engineering (ENG).
- 90 credits within the College of Science & Technology (CST), the College of Liberal Arts (CLA), or the College of Engineering (ENG).
- All students in the College of Science and Technology are required to take a one credit first year seminar. SCTC 1001 CST First Year Seminar is the appropriate course option for every entering first year CST major. Transfer students should use SCTC 2001 CST Transfer Seminar to fulfill this requirement. Other courses that fulfill this requirement may be found on the CST College Requirements page.

3. **Major Requirements for Bachelor of Science (70-74 s.h.)**

   At least 9 courses required for the major must be completed at Temple. At least 7 Chemistry courses must be completed at Temple.

4. **American Chemical Society (ACS) Certification Requirements (optional, see Footnote 2 below for more details)**

   - A foundational course in each of the 5 areas of chemistry (analytical, biochemistry, inorganic, organic, and physical). General chemistry courses do not count as foundational courses.
   - In-depth courses in at least 4 of the 5 areas, where an in-depth course is defined as a second semester of study in that particular area. For example, CHEM 2202 Organic Chemistry II qualifies as an in-depth course in organic chemistry.
   - 400 laboratory hours.

### Chemistry

Select one of the following:

<table>
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<th>Title</th>
<th>Credit Hours</th>
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<tr>
<td>CHEM 1031</td>
<td>General Chemistry I</td>
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<tr>
<td>&amp; CHEM 1033</td>
<td>and General Chemistry Laboratory I</td>
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<tr>
<td>CHEM 1951</td>
<td>Honors General Chemical Science I</td>
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<tr>
<td>&amp; CHEM 1953</td>
<td>and Honors Chemical Science Laboratory I (F)</td>
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<th>Title</th>
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<td>&amp; CHEM 1034</td>
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<td>&amp; CHEM 1954</td>
<td>and Honors Chemical Science Laboratory II (S)</td>
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<td>and Organic Chemistry Laboratory I</td>
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<td>CHEM 2211</td>
<td>Organic Chemistry for Majors I</td>
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<td>&amp; CHEM 2213</td>
<td>and Organic Majors Laboratory I (F)</td>
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<td>CHEM 2921</td>
<td>Organic Chemistry for Honors I</td>
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<tr>
<td>&amp; CHEM 2923</td>
<td>and Organic Honors Laboratory I (F)</td>
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<td>and Organic Chemistry Laboratory II</td>
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<td>Credits</td>
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<td>Techniques of Chemical Measurement I</td>
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<tr>
<td>&amp; CHEM 3105</td>
<td>and Introduction to Chemical Research Techniques</td>
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<td>CHEM 3301</td>
<td>Physical Chemistry Lecture I</td>
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<td>CHEM 3302</td>
<td>Physical Chemistry Lecture II</td>
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<td>CHEM 3397</td>
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<td>and Physical Chemistry Laboratory II</td>
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<td>Two Advanced Chemistry courses (4002 or above)</td>
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<td>CHEM 2891 Introduction to Undergraduate Research</td>
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<td>CHEM 3881 Cooperative Research</td>
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<td>CHEM 3891 Undergraduate Research</td>
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<td></td>
<td>CHEM 4881 Cooperative Research</td>
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<td>PHYS 2101</td>
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<td>PHYS 2796</td>
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<td>PHYS 3101</td>
<td>Analytical Mechanics (F)</td>
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<td>PHYS 3301</td>
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<td>Thermal Physics (F)</td>
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<td>MATH 1041</td>
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<td>MATH 2043</td>
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<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I (F)</td>
<td></td>
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<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I (F)</td>
<td></td>
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<td></td>
<td>Select one of the following:</td>
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<tr>
<td>PHYS 1062</td>
<td>Elementary Classical Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 1962</td>
<td>Honors Elementary Classical Physics II (S)</td>
<td></td>
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<tr>
<td>PHYS 2022</td>
<td>General Physics II</td>
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**PHYS 2922**

Honors General Physics II (S)

<table>
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<th>Code</th>
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<td><strong>Total Credit Hours</strong></td>
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<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>(S)</td>
<td>Spring only course</td>
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</tbody>
</table>

1. CHEM 4881 and CHEM 4891 will not fulfill an Advanced Chemistry elective for the Chemistry B.A. or B.S. degree.
2. There are several course choices that can be used to meet the ACS certification requirements. See an advisor if you have any questions. The most straightforward pathway is for students to take the elective courses CHEM 4401 Biochemistry I and CHEM 4003 Inorganic Synthesis. Alternately, students could take CHEM 4401 Biochemistry I and CHEM 4002 Advanced Inorganic Chemistry, but this pathway would require additional lab courses (see a Chemistry faculty advisor). Another option is for students to take the elective courses CHEM 4401 Biochemistry I and BIOL 4344 Research Techniques in Biochemistry. In order to fulfill the ACS-mandated requirement of 400 laboratory hours, students must complete either CHEM 4207 Advanced Organic Preparations OR any two (2) of the following: CHEM 3881 Cooperative Research and/or CHEM 3891 Undergraduate Research, CHEM 4004 Crystallography and Diffraction, CHEM 4103 Instrumental Design, CHEM 4107 Drug Analysis, CHEM 4108 Investigative Chemistry, or CHEM 4503 Introduction to Polymer Chemistry.
3. One advanced science course, for a total of 4 credits, may be satisfied by a total of 4 credits of any combination of CHEM 2891, CHEM 3881, CHEM 3891, CHEM 4881, or CHEM 4891. No more than 1 credit of CHEM 2891 may be used toward this total. The research courses may only be used as one advanced science course.

**Calculation of Major GPA**

Courses listed under the major requirements for the degree will be included in the calculation of the major GPA. Courses that could not apply toward the major as an elective or required course would not be counted in the calculation of the major GPA. This would include CHEM 1027, for example.

**Distinction in Major**

To graduate with Distinction in Major, students are required to achieve a 3.33 GPA or higher in all the Chemistry courses in their major.

**Suggested Academic Plan**

All prospective majors should schedule an appointment with one of the departmental advisors (names of current Faculty Advisors are available in the About section) to plan a program of study. The recommended order of courses for the major is listed below; a different order is acceptable as long as the student adheres to prerequisite requirements.

**Bachelor of Science in Chemistry**

**Requirements for New Students starting in the 2021-2022 Academic Year**

**Year 1**

**Fall**

<table>
<thead>
<tr>
<th>Credit Hours</th>
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<td>4</td>
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</tbody>
</table>

Select one of the following:

- CHEM 1031
- CHEM 1033
- CHEM 1951
- CHEM 1953
- MATH 1041 or 1941
- SCTC 1001
- ENG 0802, 0812, or 0902

- Calculus I
- CST First Year Seminar
- Analytical Reading and Writing [GW]
- Elective

**Term Credit Hours**

| 15 |

**Spring**

Select one of the following:

- CHEM 1032
- CHEM 1034
- CHEM 1952
- CHEM 1954
- MATH 1042 or 1942

- General Chemistry II
- Honors General Chemical Science II (S)
- Calculus II

<p>| 4  |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
<td>Year 2</td>
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<tr>
<td>Fall</td>
<td>IH 0851 or 0951</td>
<td>Intellectual Heritage I: The Good Life [GY]</td>
<td>3</td>
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<td></td>
<td>Electives</td>
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<td><strong>Term Credit Hours</strong></td>
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<tr>
<td></td>
<td><strong>Year 2</strong></td>
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<td></td>
<td><strong>Fall</strong></td>
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<tr>
<td>CHEM 2201</td>
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<td>CHEM 2921</td>
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<td>PHYS 1961</td>
<td></td>
<td>Honors Elementary Classical Physics I (F)</td>
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<td>PHYS 2021</td>
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<td>PHYS 2921</td>
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<td>Honors General Physics I (F)</td>
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<td>MATH 2043 or 2943</td>
<td>Calculus III</td>
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<td>IH 0852 or 0952</td>
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<td>PHYS 1962</td>
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<td>CHEM 3103</td>
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<td>Techniques of Chemical Measurement I(^1)</td>
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<td><strong>Term Credit Hours</strong></td>
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<td><strong>Spring</strong></td>
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<td>CHEM 3302</td>
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<td>Physical Chemistry Lecture II</td>
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<tr>
<td>CHEM 3397</td>
<td></td>
<td>Physical Chemistry Laboratory I [WI]</td>
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<td>Inorganic Chemistry</td>
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Year 4

Fall

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<th>Course Title</th>
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<td>CHEM 3398</td>
<td>Physical Chemistry Laboratory II [WI]</td>
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<td>Advanced Chemistry Course - 4002 or above 2,3</td>
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<tr>
<td>Advanced Science Course 3</td>
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**Term Credit Hours** 15

Spring

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<td>Advanced Science Course 3</td>
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</table>

**Term Credit Hours** 15

**Total Credit Hours:** 123

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1. It is strongly encouraged that CHEM 3103/CHEM 3105 be taken before all chemistry laboratory courses numbered above 3105.

2. Advanced Chemistry Courses for B.S. students consist of all courses in Chemistry having a number of 4002 or above (except CHEM 4881 and CHEM 4891). If the student has successfully completed the appropriate prerequisite course, a graduate course in Chemistry may be included in this category.

3. There are several course choices that can be used to meet the ACS certification requirements. See an advisor if you have any questions. The most straightforward pathway is for students to take the elective courses CHEM 4401 Biochemistry I and CHEM 4003 Inorganic Synthesis. Alternatively, students could take CHEM 4401 Biochemistry I and CHEM 4002 Advanced Inorganic Chemistry, but this pathway would require additional lab courses (see a Chemistry faculty advisor). Another option is for students to take the elective courses CHEM 4401 Biochemistry I and BIOL 4344 Research Techniques in Biochemistry. In order to fulfill the ACS-mandated requirement of 400 laboratory hours, students must complete either CHEM 4207 Advanced Organic Preparations OR any two (2) of the following: CHEM 3881 Cooperative Research and/or CHEM 3891 Undergraduate Research, CHEM 4004 Crystallography and Diffraction, CHEM 4103 Instrumental Design, CHEM 4107 Drug Analysis, CHEM 4108 Investigative Chemistry, or CHEM 4503 Introduction to Polymer Chemistry.

Advanced Science Courses for B.S. students consist of:

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<th>Credit Hours</th>
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<tr>
<td>CHEM 2891</td>
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<td>CHEM 3881</td>
<td>Cooperative Research</td>
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<td>CHEM 3891</td>
<td>Undergraduate Research</td>
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<td>CHEM 4891</td>
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<tr>
<td>BIOL 2296</td>
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<td>BIOL 3096</td>
<td>Cell Structure and Function (F)</td>
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<td>BIOL 3265</td>
<td>Developmental Biology (F)</td>
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<td>BIOL 3334</td>
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<td>EES 2011</td>
<td>Mineralogy I</td>
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<tr>
<td>MATH 2101</td>
<td>Linear Algebra</td>
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<td>MATH 3031</td>
<td>Probability Theory I</td>
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<tr>
<td>PHYS 2101</td>
<td>Classical Mechanics (S)</td>
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<td>PHYS 2502</td>
<td>Mathematical Physics (S)</td>
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<td>PHYS 2796</td>
<td>Introduction to Modern Physics (S)</td>
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<td>PHYS 3101</td>
<td>Analytical Mechanics (F)</td>
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"Chemistry, B.S."
<table>
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<tr>
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<td>PHYS 3302</td>
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<td>PHYS 4101</td>
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<td>PHYS 4301</td>
<td>Electronics</td>
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All other Physics courses numbered above 4301: 3-4

(F) - Fall only course  
(S) - Spring only course

1. No more than one credit of CHEM 2891 may be used toward this total.