

# CHEMISTRY - 5-YEAR BACHELOR OF SCIENCE AND MASTER OF SCIENCE IN CHEMISTRY

The combined degree program enables ambitious and academically talented chemistry majors at Texas A&M University to earn both a bachelor's degree and a master's degree within a period of five years after entering Texas A&M. The curriculum in the Bachelor of Science and Masters of Science in Chemistry 5-year combined program provides a comprehensive, solid foundation in all of the major branches of chemistry, including undergraduate research. Undergraduate chemistry research activities involve substantial use of modern scientific techniques and equipment, including major instrumentation. The student involved in this activity also gains considerable insight into the profession by means of substantial individual contact with chemistry department faculty. Students in this program pursue electives in science and related fields that provide a measure of flexibility to develop expertise in areas complementary to chemistry. Among the various advantages of the program, upon its completion a student will be in an exceptionally strong position to enter:

- the professional industrial job marketplace;
- a career in educational technology, science policy, or science communication;
- a doctoral program in chemistry, or in a related discipline, particularly at international institutions that require an MS for admission.

## Program Requirements

### First Year

Fall		Semester Credit Hours
CHEM 100	Horizons in Chemistry	1
CHEM 119	Fundamentals of Chemistry I <sup>1</sup>	4
MATH 151 or MATH 171	Engineering Mathematics I or Calculus I	4
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )		3
Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )		3
<b>Semester Credit Hours</b>		<b>15</b>
Spring		
CHEM 120	Fundamentals of Chemistry II <sup>1</sup>	4
ENGL 104 or ENGL 210	Composition and Rhetoric or Technical and Professional Writing	3
MATH 152 or MATH 172	Engineering Mathematics II or Calculus II	4
PHYS 206	Newtonian Mechanics for Engineering and Science	3
PHYS 226	Physics of Motion Laboratory for the Sciences	1

Government/Political science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a> )	3
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**Semester Credit Hours** 18

Summer	
General electives <sup>2</sup>	6

**Semester Credit Hours** 6

Second Year		
Fall		
CHEM 227	Organic Chemistry I <sup>1</sup>	3
CHEM 231	Techniques of Organic Chemistry	2
CHEM 315	Fundamentals of Quantitative Analysis	3
CHEM 318	Quantitative Analysis Laboratory	1
PHYS 207	Electricity and Magnetism for Engineering and Science	3
PHYS 227	Electricity and Magnetism Laboratory for the Sciences	1
Select one of the following:		3-4
MATH 221	Several Variable Calculus	
MATH 251	Engineering Mathematics III	
MATH 253	Engineering Mathematics III	

**Semester Credit Hours** 16

Spring		
CHEM 228	Organic Chemistry II <sup>1</sup>	3
CHEM 234	Organic Synthesis and Analysis <sup>3</sup>	3
CHEM 362	Descriptive Inorganic Chemistry	3
Select one of the following:		3
MATH 304	Linear Algebra	
MATH 308	Differential Equations	
STAT 211	Principles of Statistics I	

American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> )	3
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Social and behavioral sciences ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a> )	3
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**Semester Credit Hours** 18

Summer		
CHEM 491	Research <sup>4</sup>	6

**Semester Credit Hours** 6

Third Year		
Fall		
CHEM 327	Physical Chemistry I	3
CHEM 433	Advanced Inorganic Chemistry Laboratory	2
Communication ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a> )		3
Language, philosophy and culture ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a> )		3
General electives <sup>2</sup>		6

**Semester Credit Hours** 17

Spring		
CHEM 325	Physical Chemistry Laboratory I	1

CHEM 328	Physical Chemistry II	3
CHEM 415	Analytical Chemistry	3
CHEM 434	Analytical Instrumentation Laboratory	2
CHEM 481	Seminar <sup>3</sup>	2
Creative arts ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a> )		3
Graduate Chemistry <sup>5</sup>		3
<b>Semester Credit Hours</b>		<b>17</b>
<b>Fourth Year</b>		
<b>Fall</b>		
CHEM 326	Physical Chemistry Laboratory II	1
Graduate Chemistry <sup>5</sup>		8
General electives <sup>2</sup>		3
<b>Semester Credit Hours</b>		<b>12</b>
<b>Spring</b>		
Graduate Chemistry <sup>5</sup>		10
<b>Semester Credit Hours</b>		<b>10</b>
<b>Fifth Year</b>		
<b>Fall</b>		
Graduate Chemistry <sup>5</sup>		9
<b>Semester Credit Hours</b>		<b>9</b>
<b>Spring</b>		
Graduate Chemistry <sup>5</sup>		6
<b>Semester Credit Hours</b>		<b>6</b>
<b>Total Semester Credit Hours</b>		<b>150</b>

taken from CHEM or other departments; consult with advisor for course selection information.

Graduation requirements include a requirement for 3 hours of International and Cultural Diversity (<https://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/>) courses and 3 hours or Cultural Discourse (<https://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses. A course satisfying a Core category, a college/department requirement, or a general elective can be used to satisfy this requirement.

The total hours of CHEM 484 (<https://catalog.tamu.edu/search/?P=CHEM%20484>), CHEM 485 (<https://catalog.tamu.edu/search/?P=CHEM%20485>), and CHEM 491 (<https://catalog.tamu.edu/search/?P=CHEM%20491>) taken by BS chemistry majors on a graded (A-F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.

Electives should be chosen in consultation with the chemistry advisor and should be selected to meet the residency requirement (36 hours at 300-400 level must be taken at Texas A&M).

The program includes a total of 156 hours, which up to 6 hours may be applied toward both the Bachelor of Science in Chemistry and the Master of Science in Chemistry (Non-thesis option).

<sup>1</sup> Select a section designated for chemistry majors.

<sup>2</sup> Select any course 100-499 not used elsewhere except AERS 100-299 (<https://catalog.tamu.edu/undergraduate/course-descriptions/aers/>); CHEM 222 (<https://catalog.tamu.edu/search/?P=CHEM%20222>), CHEM 242 (<https://catalog.tamu.edu/search/?P=CHEM%20242>); MATH 102 (<https://catalog.tamu.edu/search/?P=MATH%20102>), MATH 140 (<https://catalog.tamu.edu/search/?P=MATH%20140>), MATH 142 (<https://catalog.tamu.edu/search/?P=MATH%20142>), MATH 167 (<https://catalog.tamu.edu/search/?P=MATH%20167>), MATH 168 (<https://catalog.tamu.edu/search/?P=MATH%20168>); MLSC 100-299 (<https://catalog.tamu.edu/undergraduate/course-descriptions/mlsc/>); NVSC 100-299 (<https://catalog.tamu.edu/undergraduate/course-descriptions/nvsc/>); PHYS 201 (<https://catalog.tamu.edu/search/?P=PHYS%20201>), PHYS 202 (<https://catalog.tamu.edu/search/?P=PHYS%20202>), PHYS 205 (<https://catalog.tamu.edu/search/?P=PHYS%20205>).

<sup>3</sup> This is a designated C- or W-course.

<sup>4</sup> Students may substitute 3 hours of CHEM 484 (<https://catalog.tamu.edu/search/?P=CHEM%20484>) for CHEM 491 (<https://catalog.tamu.edu/search/?P=CHEM%20491>) in consultation with an advisor.

<sup>5</sup> 21 credit hours must be taken from CHEM 601-673 (<http://catalog.tamu.edu/graduate/course-descriptions/chem/>), CHEM 689; 6 of these credit hours will be applied towards both BS and MS degrees in Chemistry; 6 other hours of graduate courses in chemistry may be selected from CHEM 681 (up to 2 hours), CHEM 684 (up to 4 hours), CHEM 685 (up to 6 hours), CHEM 695 (up to 3 hours), or CHEM 697 (up to 2 hours); 9 additional credit hours of graduate courses may be