Department of Chemistry

Program of Chemistry

I. Introduction

Chemistry is regarded as the central science because of its role in connecting different subjects and its importance in interdisciplinary research, such as chemical biology, materials science, energy, agricultural development, drug discovery and so on.

Founded in 2011, the Chemistry Department of SUSTech has 23 full-time faculty members now. Thanks to the strong support from both the central government and the Shenzhen municipal government, the department aims to be one of the best in China and has attracted many outstanding experts from all over the world, some of whom are tenured full professors or equivalents in the US before joining SUSTech. All faculty members are supported by various high-level talent programs in China—including 4 supported by the prestigious Thousand Talents Program, 8 supported by the Young Thousand Talents Program, 1 supported by the Outstanding Youth Fund, and 20 supported by the Peacock Plan-Overseas High-Caliber Personnel of Shenzhen. In particular, the Chemistry Department strives to gain internationally reputed achievements in research and to foster excellent scientists and engineers in the areas of inorganic chemistry, organic chemistry, bioanalytical chemistry, and physical chemistry/molecular materials chemistry. The Department of Chemistry has been awarded with research grants of more than one billion RMB (or 160 million US$). In the last three years, more than 100 research papers have been published in prestigious chemistry journals, such as Nature Communication, Chem. Soc. Rev., J. Am. Chem.Soc., Angew. Chem. Int. Ed., and etc., some of which were highlighted in Nature, Nature Chemistry, or used as VIP cover papers.

Adhering to our university's motto of "Research, Innovation and Entrepreneurship," the Chemistry Department focuses on cultivating students' innovation, critical thinking and ability for interdisciplinary cooperation. The curriculum design emphasizes not only the basic theory, but also practical training particularly in the areas of new medicine, new energy, and new materials. Undergraduates are strongly encouraged to participate in various research programs supervised by professors to cultivate their creativity, practical skills and ability for interdisciplinary cooperation. The department maintains a wide array of sophisticated instrumentation necessary for modern chemical research and teaching.

The department chair is Prof. Xumu Zhang, a former distinguished professor of chemistry at Rutgers University, the State University of New Jersey，and a recipient of ACS Cope Scholar Award in 2002. Prof. Robert H. Grubbs of Caltech (2005 Nobel Laureate of Chemistry) serves as a chairman of the advisory board of the Chemistry Department.

II. Objectives

The undergraduate Chemistry program is aimed at training new generations of top-notch innovative personnel who have a solid background in mathematics and physics, extensive knowledge of chemistry, strong experimental skills, an international perspective and an entrepreneurial spirit.

III. Program Length and Degree Requirement

Program length: 4 years

Degree conferred: Bachelor of Science

The minimum credit requirement for graduation: 135 credits (not including English courses)

IV. Discipline

Chemistry

V. Main Courses

General Chemistry, General Chemistry Laboratory, Inorganic Chemistry Fundamentals, Organometallics, Coordination Chemistry, Organic Chemistry I & II, Analytical Chemistry, Principle of Instrumental Analysis, Practice of Instrumental Analysis, Physical Chemistry I & II, Inorganic Chemistry Laboratory, Analytical Chemistry Laboratory, Organic Chemistry Laboratory, Physical Chemistry Laboratory, Polymer Chemistry, Modern Strategic Synthesis, Principle of Chemical Engineering, Frontiers of Chemical Science, Supramolecular Chemistry, Advanced Instrumentation Systems I & II, Medicinal Chemistry, Asymmetric Synthesis, Colloid & Surface Chemistry, and so on.

VI. Practice-Based Courses

General Chemistry Laboratory, Inorganic Chemistry Laboratory, Analytical Chemistry Laboratory, Organic Chemistry Laboratory, Physical Chemistry Laboratory, Undergraduate Research Program, Undergraduate Thesis, and so on.（See Table 3）.

VII. Course Structure and Credit Requirements

General Education (GE) Required Courses: 51.5 credits (not including English courses);

General Education (GE) Elective Courses: 10 credits;

Major Required Courses: 45.5 credits;

Major Elective Courses: 12 credits ;

Undergraduate Thesis/Projects: 8 credits;

Research Projects: 8 credits;

The minimum credit requirement for graduation: 135 credits (not including English courses).

VIII. Requirement for GE Required Courses

Course Code	Course Name	Credits
CH101A	General Chemistry A	4
MA101B	Calculus I A	4
MA102B	Calculus II A	4
MA103B	Linear Algebra I B	4
PHY103B	General Physics I B	4
PHY105B	General Physics II B	4
BIO102B	General Biology B (Introduction to Life Science)	3
CS102B	Introduction to Programming B	3
PHY104	Experiment for Foundation of Physics	1.5

IX. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
CH101A	General Chemistry A	
CH102-17	General Chemistry Laboratory A	
CH213	Inorganic Chemistry Fundamentals	
CH203	Organic Chemistry I	
CH205	Analytical Chemistry	
CH207	Analytical Chemistry Laboratory	
CH214	Organometallics	
CH215	Coordination Chemistry	
CH204	Inorganic Chemistry Laboratory	
CH206	Organic Chemistry II	
CH208	Organic Chemistry Laboratory	

X. Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
Major Foundational Courses	CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr.	1/ Spr.	B	CH101A	Chem.
	CH213	Inorganic Chemistry Fundamentals	3		3	Fall	2/ Fall	B	CH101A	Chem.
	CH203	Organic Chemistry I	4		4	Fall	2/ Fall	B	CH101A	Chem.
	CH205	Analytical Chemistry	4		4	Fall	2/ Fall	B	CH101A	Chem.
	CH207	Analytical Chemistry Laboratory	2	2	4	Fall	2/ Fall	B	CH102-17, CH205	Chem.
	CH214	Organometallics	3		3	Spr.	2/ Spr.	E	CH213	Chem.
	CH215	Coordination Chemistry	3		3	Spr.	2/ Spr.	E	CH213	Chem.
	CH204	Inorganic Chemistry Laboratory	2	2	4	Spr.	2/ Spr.	B	CH213, CH102-17	Chem.
	CH206	Organic Chemistry II	4		4	Spr.	2/ Spr.	B	CH203	Chem.
	CH208	Organic Chemistry Laboratory	2	2	4	Spr.	2/ Spr.	C	CH203, CH102-17	Chem.
	CH301	Physical Chemistry I	4		4	Fall	3/ Fall	E	MA102B, PHY105B, CH101A	Chem.
	CH303	Physical Chemistry Laboratory	2	2	4	Fall	3/ Fall	C	CH301, CH102-17	Chem.
	CH302	Physical Chemistry II	4		4	Spr.	3/ Spr.	B	CH301	Chem.
	Total		38.5	9.5	48					
Major Core Courses	CH305-1	Principle of Instrumental Analysis	2		2	Spr.	3/ Spr.	B	CH205, CH207	Chem.
	CH305-2	Practice of Instrumental Analysis	2	2	4	Spr.	3/ Spr.	C	CH205, CH207, CH305-1	Chem.
	CH403	Principle of Chemical Engineering	3		3	Spr/ Fall	4/ Fall	B	MA102B, PHY105B	Chem.
	Total		7	2	9					
Major Practical Courses	CH480	Projects of Science and Technology Innovation	8	8	8	Fall & Spr.	3/ Spr.& Fall			Chem.
	CH490	Degree Thesis (Design)	8	8	8	Fall & Spr.	4/ Spr.& Fall			Chem.
	Total		16	16	16					
Total			61.5	27.5	73					

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
CH210	Frontiers of Chemical Science	2		2	Spr.	2/ Spr.	B		Chem.
GE351	Scientific Literature and Writing	1		1	Fall	3/ Fall	C		Chem.
CH309	Advanced Organic Chemistry Laboratory	2	2	4	Fall	3/ Fall	B	CH206, CH208	Chem.
CH327	Modern Strategic Synthesis by Advanced Organic Chemistry	2		2	Fall	3/ Fall	B	CH206, CH214, CH215	Chem.
CH326	Modern Strategic Synthesis by Organometallics	2		2	Fall	3/ Fall	E	CH206, CH214, CH215	Chem.
CH313	Chemical Biology	3		3	Fall	3/Fall.	B	CH206	Chem.
CH315	Polymer Chemistry	3		3	Fall	3/ Fall	B	CH206, CH301	Chem.
CH317	Medicinal Chemistry	3		3	Fall	3/ Fall	C	CH206	Chem.
CH319	Advanced Inorganic Chemistry Laboratory	2	2	4	Fall	3/ Fall	B	CH214, CH215, CH204	Chem.
CH321	Polymer Chemistry Laboratory	1	1	2	Fall	3/ Fall	C	CH206, CH301	Chem.
CH324	Element-Organic Chemistry	2		2	Fall	3/ Fall	B	CH214, CH215	Chem.
CH325	Heterocyclic Chemistry	3		3	Fall	3/ Fall	B	CH101A	Chem.
CH304	Nanomaterials Synthesis and Nanotechnology	2		2	Spr.	3/ Spr.	E	CH214, CH215, CH302	Chem.
CH306	Laboratory for Micro-Nano Synthesis, Technology and Application	2	2	4	Spr.	3/ Spr.	E	CH214, CH215, CH302	Chem.
CH308 -14	Supramolecular Chemistry	3		3	Spr.	3/ Spr.	B	CH206, CH302	Chem.
CH310 -15	Colloid & Surface Chemistry	2		2	Spr.	3/ Spr.	B	CH206, CH302	Chem.
CH312	Organic Spectroscopy	2		2	Spr.	3/ Spr.	C	CH206	Chem.
CH314	Asymmetric Synthesis	3		3	Spr.	3/ Spr.	B	CH206, CH326, CH327	Chem.
CH316	Bioinorganic Chemistry	2		2	Spr.	3/ Spr.	E	CH101A	Chem.
CH318 -14	Single Crystal X-ray Structure Analysis	2		2	Spr.	3/ Spr.	B	CH101A	Chem.
CH320	Organic Name Reactions	2		2	Spr.	3/ Spr.	B	CH101A	Chem.
CH322	Advanced mass spectrometry analysis	2	1	3	Spr.	3/ Spr.	B	CH205	Chem.
CH323	Natural Product Total Synthesis	2		2	Spr.	3/ Spr.	B	CH206	Chem.
CH212 -16	Advanced Instrumentation Systems I	4	2	6	Spr.	3/ Spr.	E	CH101A	Chem.
CH307 -13	Advanced Instrumentation Systems II	2	2	4	Fall	4/ Fall	E	CH212-16	Chem.

CH401	Computational Chemistry	3	1	4	Fall	4/ Fall	C	CH302	Chem.
CH405	Advanced Inorganic Chemistry	3		3	Fall	4/ Fall	B	CH214, CH215	Chem.
CH407	Selected Topics in Nanoscience and Nanotechnology	3	1	4	Fall	4/ Fall	E	CH214, CH215, CH302	Chem.
CH409	Organic Optoelectronic Materials and Devices	4	1	5	Fall	4/ Fall	E	CH206	Chem.
CH410	Cosmetic Chemistry and Formula	3	1	4	Fall	4/ Fall	B	CH208	Chem.
CHEM S001	Frontiers of Chemical Science（Summer）	1		1	Sum.	1/Sum.	B		Chem.
CHEM S002	General Chemistry Laboratory B	0.5	0.5	1	Sum.	1/Sum.	B	CH102-17	Chem.
Total		73.5	16.5	90					

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr.	1/ Spr.	B	CH101A	Chem.
CHEMS002	General Chemistry Laboratory B	0.5	0.5	1	Sum.	1/Sum.	B	CH102-17	Chem.
CH207	Analytical Chemistry Laboratory	2	2	4	Fall	2/ Fall	B	CH102-17, CH205	Chem.
CH204	Inorganic Chemistry Laboratory	2	2	4	Spr.	2/ Spr.	B	CH213, CH102-17	Chem.
CH208	Organic Chemistry Laboratory	2	2	4	Spr.	2/ Spr.	C	CH203, CH102-17	Chem.
CH303	Physical Chemistry Laboratory	2	2	4	Fall	3/ Fall	C	CH301, CH102-17	Chem.
CH305-2	Practice of Instrumental Analysis	2	2	4	Spr.	3/ Spr.	C	CH205, CH207, CH305-1	Chem.
CH309	Advanced Organic Chemistry Laboratory	2	2	4	Fall	3/ Fall	B	CH206, CH208	Chem.
CH319	Advanced Inorganic Chemistry Laboratory	2	2	4	Fall	3/ Fall	B	CH214, CH215, CH204	Chem.
CH321	Polymer Chemistry Laboratory	1	1	2	Fall	3/Fall	C	CH206, CH301	Chem.
CH322	Advanced mass spectrometry analysis	2	1	3	Spr.	3/ Spr.	B	CH205	Chem.
CH306	Laboratory for Micro-Nano Synthesis, Technology and Application	2	2	4	Spr.	3/ Spr.	E	CH214, CH215, CH302	Chem.
CH212-16	Advanced Instrumentation Systems I	4	2	6	Spr.	3/ Spr.	E	CH101A	Chem.
CH307-13	Advanced Instrumentation Systems II	2	2	4	Fall	4/ Fall	E	CH212-16	Chem.
CH401	Computational Chemistry	3	1	4	Fall	4/ Fall	C	CH302	Chem.
CH407	Selected Topics in Nanoscience and Nanotechnology	3	1	4	Fall	4/ Fall	E	CH214, CH215, CH302	Chem.
CH409	Organic Optoelectronic Materials and Devices	4	1	5	Fall	4/ Fall	E	CH206	Chem.
CH410	Cosmetic Chemistry and Formula	3	1	4	Fall	4/ Fall	B	CH208	Chem.
CH480	Projects of Science and Technology Innovation	8	8	16	Fall & Spr.	3/ Fall & Spr.			Chem.
CH490	Degree Thesis (Design)	8	8	16	Fall & Spr.	4/ Fall & Spr.			Chem.
Total		56	44	100					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	The Minimum Credit Requirement
General Education (GE) Required Courses	864	51.5	51.5
General Education (GE) Elective Courses			10
Major Required Courses	912	45.5	45.5
Major Elective Courses	1440	73.5	12
Research Projects, Internship and Undergraduate Thesis/Projects	512	16	16
Total			135