Bulletin 2023-24 Chemistry (02/21/24)

Chemistry

Phone:	314-935-6530
Email:	chemistry@wustl.edu
Website:	http://chemistry.wust

Majors The Major in Chemistry

Total units required: 53

Required courses: To prepare for a major in chemistry, students will take the following:

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Code	Title	Units
Chem 111A	General Chemistry I	3
Chem 112A	General Chemistry II	3
Chem 151	General Chemistry Laboratory I	2
Chem 152	General Chemistry Laboratory II	2
Chem 261	Organic Chemistry I with Lab	4
Chem 262	Organic Chemistry II with Lab	4
Math 131	Calculus I	3
Physics 191	Physics I	3
Physics 191L	Physics I Laboratory	1
Physics 192	Physics II	3
Physics 192L	Physics II Laboratory	1
Math 132	Calculus II	3
Math 233	Calculus III	3
Total Units		35

Note: In certain instances, students may substitute Chem 105 Introductory General Chemistry I and Chem 106 Introductory General Chemistry II for Chem 111A General Chemistry I and Chem 112A General Chemistry II. Please consult the department's director of undergraduate studies for details.

Majors in chemistry must take a minimum of 18 units of advanced courses in chemistry or biochemistry, among which the following must be included:

Code	Title	Units
Chem 401	Physical Chemistry I	3
Chem 402	Physical Chemistry II	3
Chem 461	Inorganic Chemistry	3
Total Units		9

In addition, 9 units in chemistry at the 300 level or above must be taken (not including Chem 490 Introduction to Research or Chem 495 Advanced Undergraduate Research in Chemistry). Biol 451 General Biochemistry may be used to complete 3 of the required 9 units.

At least 3 of these 9 advanced units must be in a laboratory course chosen from the following list:

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Code	Title	Units
Chem 358	Organic Chemistry Laboratory II	4
Chem 435	Nuclear and Radiochemistry Lab	3
Chem 445	Instrumental Methods: Physical Chemistry	3
Chem 462	Synthetic Polymer Chemistry Laboratory	3
Chem 470	Inorganic Chemistry Laboratory	3

Physics 217 Introduction to Quantum Physics and additional mathematics courses are also recommended. Chem 181 First-Year Opportunity: Applications in Chemistry, a seminar to introduce firstyear students to research activities in the department, is optional. A working knowledge of computer programming and of a foreign language, such as German or Russian, is encouraged but not required.

Students have the advantage of planning their programs with their advisors in accordance with their personal interests. Some graduate courses are also available to seniors.

All chemistry course work must be taken in residence at Washington University to be applied toward the chemistry major. A minimum grade of C- must be earned in each course to count toward the chemistry major.

Note: Per the College of Arts & Sciences guidelines, for students who also pursue a minor or more than one major or minor program, only introductory (100- and 200-level) courses may be counted, when relevant, toward the requirements of both programs. All advanced (300- and 400-level) courses must be unique to each program. In other words, no advanced course may be "double-counted" for the course work needed to fulfill either program's minimal requirements. Should a student's major and minor programs require the same course, a departmentally sanctioned elective must be chosen to replace the course in one of the programs.

The Major With a Concentration in Biochemistry

Total units required: 59

Chemistry majors with a concentration in biochemistry should add Biol 2960 Principles of Biology I and Biol 2970 Principles of Biology II as prerequisites to the major and specify a minimum of 18 units in advanced courses in biology and chemistry, among which the following must be included:

Code	Title	Units
Chem 481	General Biochemistry I	3
Chem 482	General Biochemistry II	3
Chem 401	Physical Chemistry I	3
Chem 402	Physical Chemistry II	3
Chem 461	Inorganic Chemistry	3
Total Units		15

In addition, at least one advanced lab must be chosen from the following list:

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Code	Title	Units
Chem 358	Organic Chemistry Laboratory II	4
Chem 435	Nuclear and Radiochemistry Lab	3
Chem 445	Instrumental Methods: Physical Chemistry	3
Chem 462	Synthetic Polymer Chemistry Laboratory	3
Chem 470	Inorganic Chemistry Laboratory	3
Biol 4522	Laboratory in Protein Analysis, Proteomics and Protein Structure	3
Biol 4523	Molecular Methods in Enzyme Analysis	4

All chemistry course work must be taken in residence at Washington University to be applied toward the chemistry major. A minimum grade of C- must be earned in each course to count toward the chemistry major.

Note: Per the College of Arts & Sciences guidelines, for students who also pursue a minor or more than one major or minor program, only introductory (100- and 200-level) courses may be counted, when relevant, toward the requirements of both programs. All advanced (300- and 400-level) courses must be unique to each program. In other words, no advanced course may be "double-counted" for the course work needed to fulfill either program's minimal requirements. Should a student's major and minor programs require the same course, a departmentally sanctioned elective must be chosen to replace the course in one of the programs.

Additional Information

Latin Honors for the Major in Chemistry:

Total units required: 56

To qualify for Latin Honors, students must complete a minimum of 21 units in advanced courses in chemistry or biochemistry, among which the following must be included:

Code	Title	Units
Chem 401	Physical Chemistry I	3
Chem 402	Physical Chemistry II	3
Chem 461	Inorganic Chemistry	3

The student must also take two additional advanced courses in chemistry.

Students must also complete **two** additional laboratories. Students must choose one synthetic laboratory:

Code	Title	Units
Chem 358	Organic Chemistry Laboratory II	4
Chem 462	Synthetic Polymer Chemistry Laboratory	3
Chem 470	Inorganic Chemistry Laboratory	3

and one physical laboratory:

Code	Title	Units
Chem 435	Nuclear and Radiochemistry Lab	3
Chem 445	Instrumental Methods: Physical Chemistry	3

Neither Chem 490 Introduction to Research nor Chem 495 Advanced Undergraduate Research in Chemistry can be used to satisfy the advanced laboratory requirements, but Chem 495 Advanced Undergraduate Research in Chemistry can be used to satisfy an elective.

Latin Honors for the Major in Chemistry With a Concentration in Biochemistry:

Total units required: 62

To qualify for Latin Honors, students must complete a minimum of 21 units in advanced courses, including **one** of the following six courses:

Code	Title	Units
Biol 334	Cell Biology	3
Biol 349	Microbiology	4
Chem 453	Bioorganic Chemistry	3
Chem 464	Inorganic Biochemistry	3
Chem 483	Protein Biochemistry	3
Chem 485	Nucleic Acids	3

or a second laboratory course in advanced chemistry or biology chosen from the following list:

Code	Title	Units
Chem 358	Organic Chemistry Laboratory II	4
Chem 435	Nuclear and Radiochemistry Lab	3
Chem 445	Instrumental Methods: Physical Chemistry	3
Chem 462	Synthetic Polymer Chemistry Laboratory	3
Chem 470	Inorganic Chemistry Laboratory	3
Biol 4522	Laboratory in Protein Analysis, Proteomics and Protein Structure	3
Biol 4523	Molecular Methods in Enzyme Analysis	4

Departmental Honors for the Majors in Chemistry and Chemistry With a Concentration in Biochemistry: To graduate "with

distinction," a student must maintain a Chemistry grade point average of 3.5 and complete at least one semester of Chem 490 research. To graduate "with high distinction," a student must maintain a Chemistry GPA of 3.65 and complete at least two semesters of chemistry research, one of which must be Chem 495. To graduate "with highest distinction," a student must maintain a Chemistry GPA of 3.8 and complete at least two semesters of chemistry research, one of which must be Chem 495. Chemistry research is defined as a research project performed under the direction of a Chemistry GPA is calculated from the grades received in chemistry courses and chemistry prerequisites. The level of Departmental Honors that a student achieves will appear on the student's final transcript.

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