# Chemistry

**Department of Physical Sciences**

**Department Chair:**Andrea Del Vecchio

**Chemistry Program Faculty: Professors** Almeida, Cooley, Lamontagne, Knowlton, E. Magyar, J. Magyar,.; **Associate Professors**Towle-Weicksel**,** Leung; Assistant Professor Kiesewetter

Students **must** consult with their assigned advisor before they will be able to register for courses. This program also has specific retention requirements, which may be obtained from the advisor.

Chemistry B.A.

Course Requirements

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 103 | General Chemistry I | 4 | F, Sp, Su |
|  | -Or- |  |  |
| CHEM 103H | Honors General Chemistry I | 4 | As Needed |
|  |   |  |  |
| CHEM 104 | General Chemistry II | 4 | Sp, Su |
|  | -Or- |  |  |
| CHEM 104H | Honors General Chemistry II | 4 | As Needed |
|  |   |  |  |
| CHEM 205W | Organic Chemistry I | 4 | F |
| CHEM 206W | Organic Chemistry II | 4 | Sp |
| CHEM 310 | Biochemistry | 4 | F |
| CHEM 403 | Inorganic Chemistry I | 3 | F |
|  |   |  |  |
| CHEM 404W | Analytical Chemistry | 4 | Sp (even years) |
|  | -Or- |  |  |
| CHEM 416W | Environmental Analytical Chemistry | 4 | Sp (odd years) |
|  |   |  |  |
| CHEM 405 | Physical Chemistry I | 3 | F |
| CHEM 407W | Physical Chemistry Laboratory I | 1 | F |

CHOOSE ONE OF THE OPTIONS below

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 406 | Physical Chemistry II | 3 | As Needed |
|  | -Or- |  |  |
|  |   |  |  |
| CHEM 412 | Inorganic Chemistry II | 2 | Sp |
|  | -And- |  |  |
| CHEM 413 | Inorganic Chemistry Laboratory | 1 | Sp |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 414 | Instrumental Methods of Analysis | 4 | Sp (odd years) |
|  | -Or- |  |  |
| CHEM 418 | Marine Environmental Chemistry | 4 | As Needed |
|  | -Or- |  |  |
| CHEM 419 | Biochemistry Mechanisms | 3 | Sp |
|  | -Or- |  |  |
| CHEM 422 | Biochemistry Laboratory | 3 | Sp |
|  | -Or- |  |  |
| CHEM 425 | Advanced Organic Chemistry | 4 | F (odd years) |
|  | -Or- |  |  |
| CHEM 435 | Pharmacology and Toxicology | 3 | As needed |

Note: MATH 314 Calculus III is a prerequisite for CHEM 406.

Cognates

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| MATH 212 | Calculus I | 4 | F, Sp, Su |
| MATH 213 | Calculus II | 4 | F, Sp, Su |
| PHYS 101 | Physics for Science and Mathematics I | 4 | F, Sp, Su |
| PHYS 102 | Physics for Science and Mathematics II | 4 | F, Sp, Su |

Note: Prior to enrolling in any Chemistry course students must have completed the college mathematics competency.

Total Credits: 50-51

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Chemistry B.S

Course Requirements — Concentration in Biochemistry

The B.S. degree program is approved by the American Chemical Society.

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 103 | General Chemistry I | 4 | F, Sp, Su |
|  | -Or- |  |  |
| CHEM 103H | Honors General Chemistry I | 4 | As Needed |
|  |   |  |  |
| CHEM 104 | General Chemistry II | 4 | Sp, Su |
|  | -Or- |  |  |
| CHEM 104H | Honors General Chemistry II | 4 | As Needed |
|  |   |  |  |
| CHEM 205W | Organic Chemistry I | 4 | F |
| CHEM 206W | Organic Chemistry II | 4 | Sp |
| CHEM 310 | Biochemistry | 4 | F |
| CHEM 403 | Inorganic Chemistry I | 3 | F |
|  |   |  |  |
| CHEM 404W | Analytical Chemistry | 4 | Sp (even years) |
|  | -Or- |  |  |
| CHEM 416W | Environmental Analytical Chemistry | 4 | Sp (odd years) |
|  |   |  |  |
| CHEM 405 | Physical Chemistry I | 3 | F |
| CHEM 407W | Physical Chemistry Laboratory I | 1 | F |
| CHEM 419 | Biochemistry Mechanisms | 3 | Sp |
| CHEM 422 | Biochemistry Laboratory | 3 | Sp |
| CHEM 491-493 | Research in Chemistry | 1 | As needed |

Note: CHEM 491, CHEM 492, CHEM 493: Research in Chemistry can be fulfilled through any combination of these courses. It is strongly suggested that students take research credits in multiple semesters, beginning in their junior year for a total of 3 credit hours.

CHOOSE ONE OF THE OPTIONS below:

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 406 | Physical Chemistry II | 3 | As Needed |
|  | -And- |  |  |
| CHEM 408 | Physical Chemistry Laboratory II | 1 | As Needed |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 412 | Inorganic Chemistry II | 2 | Sp |
|  | -And- |  |  |
| CHEM 413 | Inorganic Chemistry Laboratory | 1 | Sp |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 414 | Instrumental Methods of Analysis | 4 | Sp (odd years) |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 418 | Marine Environmental Chemistry | 4 | As Needed |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 425 | Advanced Organic Chemistry | 4 | F (odd years) |

Cognates

|  |  |  |  |
| --- | --- | --- | --- |
| BIOL 111 | Introductory Biology I | 4 | F, Sp, Su |
| BIOL 112 | Introductory Biology II | 4 | F, Sp, Su |
| MATH 212 | Calculus I | 4 | F, Sp, Su |
| MATH 213 | Calculus II | 4 | F, Sp, Su |
| PHYS 101 | Physics for Science and Mathematics I | 4 | F, Sp, Su |
| PHYS 102 | Physics for Science and Mathematics II | 4 | F, Sp, Su |

Note: Prior to enrolling in any Chemistry course students must have completed the college mathematics competency.

Total Credits: 67-68

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Course Requirements ­— Concentration in Professional Chemistry

The B.S. degree program is approved by the American Chemical Society.

Courses

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 103 | General Chemistry I | 4 | F, Sp, Su |
|  | -Or- |  |  |
| CHEM 103H | Honors General Chemistry I | 4 | As Needed |
|  |   |  |  |
| CHEM 104 | General Chemistry II | 4 | Sp, Su |
|  | -Or- |  |  |
| CHEM 104H | Honors General Chemistry II | 4 | As Needed |
|  |   |  |  |
| CHEM 205W | Organic Chemistry I | 4 | F |
| CHEM 206W | Organic Chemistry II | 4 | Sp |
| CHEM 310 | Biochemistry | 4 | F |
| CHEM 403 | Inorganic Chemistry I | 3 | F |
|  |   |  |  |
| CHEM 404W | Analytical Chemistry | 4 | Sp (even years) |
|  | -Or- |  |  |
| CHEM 416W | Environmental Analytical Chemistry | 4 | Sp (odd years) |
|  |   |  |  |
| CHEM 405 | Physical Chemistry I | 3 | F |
| CHEM 406 | Physical Chemistry II | 3 | As Needed |
| CHEM 407W | Physical Chemistry Laboratory I | 1 | F |
| CHEM 408 | Physical Chemistry Laboratory II | 1 | As Needed |
| CHEM 414 | Instrumental Methods of Analysis | 4 | Sp (odd years) |
| CHEM 491-493 | Research in Chemistry | 1 | As needed |

Note: CHEM 491, CHEM 492, CHEM 493: Research in Chemistry can be fulfilled through any combination of these courses. It is strongly suggested that students take research credits in multiple semesters, beginning in their junior year for a total of 3 credit hours.

CHOOSE one of the options below:

|  |  |  |  |
| --- | --- | --- | --- |
| CHEM 412 | Inorganic Chemistry II | 2 | Sp |
|  | -And- |  |  |
| CHEM 413 | Inorganic Chemistry Laboratory | 1 | Sp |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 418 | Marine Environmental Chemistry | 4 | As Needed |
|  |   |  |  |
|  | -Or- |  |  |
| CHEM 425 | Advanced Organic Chemistry | 4 | F (odd years) |

Course Descriptions:

CHEM 421 - Biochemistry of Energy Metabolism (3)

The physical and chemical properties of carbohydrates and lipids are presented. Students cannot receive credit for both CHEM 421 and BIOL 421. Lecture.

Prerequisite: CHEM 206W and either BIOL 320 or CHEM 310.

Offered: As needed.

CHEM 422 - Biochemistry Laboratory (3)

Topics include basic laboratory concepts, including notebook documentation, ethics, and data interpretation, as well as experiments involving DNA cloning, protein purification, spectroscopic analysis, and functional assays. Laboratory.

Prerequisite: CHEM 310 or BIOL 320 or consent of department chair.

Offered: Spring.

CHEM 425 - Advanced Organic Chemistry (4)

Synthesis, structure determination, and mechanism are discussed in the context of natural product and bio-organic chemistry. Spectroscopic and computational methods are emphasized. Lecture and laboratory. 6 contact hours.

Prerequisite: CHEM 206W.

Offered: Fall (odd years).