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DEPARTMENT OF NATURAL SCIENCES

The Department of Natural Sciences offers degrees in biology and chemistry with course offerings in physics and engineering. The department also offers a degree in science education with a broad based emphasis in biology area.

**BIOLOGY**

The major in biology provides courses and course sequences leading to the Bachelor of Science degree in biology. The program prepares a student for pro- fessional careers and employment in biological sciences and teaching in the area of biology. Flexibility and design of the program aids in preparation for en- trance into graduate, medical, pharmacy and dental schools, as well as other professional schools. Students interested in attending medical and dental schools choose from a select number of biology and chemistry courses and are advised by the Pre-Health Advisor.

Students majoring in biology must complete a minimum of 32 hours in biology, including Biology 2111K, 2112K, 2211K, 2311K, 3101K, 3501K, 4001,

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4222 and 4701K. Additionally, the Biology major must complete 13 hours of biology electives. The electives will be chosen by the student with the advisor from a list of approved electives. Biology majors and minors must make a “C” or better in all biology, chemistry, physics, and mathematics courses. Students must meet the requirements of the Core Curriculum and pass the Regents Exam. Students must also pass a Area Concentration Achievement Test (ACAT) in biology field during the senior year. Science Education Majors (Broad Field Biology Emphasis) must complete a minimum of 56 hours in science, including Biology 2111K, 2112K, 2311K, 3250K, and 3501K. Students must also meet the requirements of the Core Curriculum and pass the Regents and GACE I exams. Students are required to pass major field examinations (GACE II) during the senior year. A grade of “C” or better is required in all science and math- ematics courses and a science education major must maintain at least a 2.5 GPA to graduate. (See teacher education advisor for additional requirements)

**CHEMISTRY**

The major in chemistry provides courses and sequences leading to the Bachelor of Science degree in chemistry. The major program is designed to follow the criteria for baccalaureate degrees as set forth by the Committee on Professional Training of the American Chemical Society. The program prepares the student for professional employment after graduation and also provides strong academic and laboratory experiences for those students who wish to pursue graduate degrees in chemistry or professional schools.

Students must meet the requirements listed in the Core Curriculum and pass the Regents’ examination. The major in chemistry must complete a minimum of 49 semester hours of chemistry. All students are required to earn at least a grade of “C” in all chemistry, biology, physics, and mathematics courses. All students are required to take the American Chemical Society standardized test in the area in which they are enrolled. Students must take a Major Field Achievement Test (MFAT) during the senior year.

**ENGINEERING**

Albany State University offers two tracks of pre-engineering programs that lead to a Bachelor of Engineering degree from the Georgia Institute of Technol- ogy: (1) The Regents’ Engineering Transfer Program (RETP) and (2) Dual Degree Program.

**TRACK 1**

The Regents Engineering Transfer Program (RETP) is a cooperative program between the Georgia Institute of Technology and Albany State University that allows students to complete the first two years of the engineering program at Albany State University and then transfer to Georgia Tech to their chosen field of engineering to complete the requirements of B.S. degree in engineering. Student will be admitted to Georgia Tech upon completion of the prescribed courses at Albany State University provided (s)he maintains an overall GPA of 2.7 as well as 2.7 in science and mathematics courses at ASU. At times Georgia Tech may add certain requirements for admission to junior level, which will equally be applied to Georgia Tech students also for advancing to the junior level in that field.

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To be eligible for admission to the RETP at Albany State University one must be a resident of Georgia and must have a minimum SAT scores of 560 on the math and 440 on the verbal portion and a high school GPA of “B” or better. Students who prefer to live and study in a smaller community may also transfer to Georgia Tech Regional Engineering Program (GTREP) at coastal city of Savannah and receive the Georgia Tech engineering degree by completing their studies at Georgia Tech campus at Savannah.

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**TRACK 2**

The Dual Degree Program (3+2) is also a cooperative program between Georgia Tech and Albany State University that is designed for students who want to have a broad liberal arts background in addition to their chosen field of engineering. The student will complete approximately three years of study towards a program in Chemistry, Computer Science or Mathematics at Albany State University and then transfer to Georgia Tech for two additional years of study in his/her chosen field of engineering. Upon successful completion of the two programs, student will earn a B.A. degree from Albany State University and a B.S. degree in Engineering from Georgia Tech. The admission and transfer requirements for Dual Degree Program are the same as the RETP program.

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Students are advised to follow the customized list of courses for each engineering discipline in order to complete their degree goal in the most efficient man- ner. Non-resident of Georgia and international students also can join the engineering program at ASU though the transfer to Georgia Tech will require higher GPA. One may also apply for transfer to other engineering colleges in the region. In the past, students have transferred to the engineering programs at Auburn University, Florida A & M University, Tuskegee University, North Carolina A&T State University and Mercer University.

**BACHELOR OF SCIENCE DEGREE IN BIOLOGY**

**Business**

Biology I. Required: 18 hours, lower division (1000-2000 Level)

**Area F Titled Credit hrs.**

BIOL 2111K Biology I 4

BIOL 2112K Biology II 4

CHEM 2301K Organic Chemistry I 4

CHEM 2302K Organic Chemistry II 4

**Education**

**Total Area F 16**

**Total Core Curriculum 59**

|  |  |  |  |
| --- | --- | --- | --- |
| **Major Courses** |  | | |
| BIOL | 2211K | General Microbiology | 4 |
| BIOL | 2311K | General Botany | 4 |
| BIOL | 3101K | Environmental Biology | 4 |
| BIOL | 3501K | Principles of Genetics | 4 |
| BIOL | 4001 | Research and Independent Study I | 1 |
| BIOL | 4222 | Biology Research | 3 |
| BIOL | 4701K | Cell and Molecular Biology | 4 |

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|  |  |  |
| --- | --- | --- |
| CHEM | 3250KBiochemistry | 4 |
| MATH 1211 Calculus I | | 4 |
| PHYS 1111K Introductory Physics I | | 4 |
| PHYS 1112K Introductory Physics II | | 4 |
| PHYS 2100 Computer Applications (If not in Area D) | | 3 |
| SPAN, FREN OR GRMN Foreign Language sequence | | 6 |
| Electives (Non-Science) | | 3 |
| Total (Major and other courses) | | 61 |
| Total above Core Hours | | 6 |
| **Total Hours in Program** | | **126** |

**PROGRAM OF STUDY FOR A BACHELOR OF SCIENCE DEGREE IN BIOLOGY**

**Course**

**Descriptions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Freshman Year Fall** | | | | **Spring** |
| ASU | 1200 | Freshman Seminar | 3 |  |
| HIST | 1002 | Intro. to African Diaspora | 2 |  |
| ENGL | 1101 and 1102 | English Composition I & II | 3 | 3 |
| MATH | 1113 | Pre-Calculus |  | 3 |
| CHEM | 1211K and 1212K | General Chemistry I & II | 4 | 4 |
| BIOL | 2111K and 2112K | Biology I & II | 4 | 4 |
| BIOL | 1801 | (Elective) |  | 1 |
| PEDH | choice |  |  | 1 |
| **Totals** |  |  | **16** | **16** |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sophomore Ye**  PEDH | **ar**  Choice |  | **Fall**  1 | **Spring**  1 |
| ENGL | 2111 | World Literature |  | 3 |
| CHEM | 2301K and 2302K | Organic Chemistry I and II | 4 | 4 |
| BIOL | 2211K | General Microbiology |  | 4 |
| POLS | 1101 | U.S. & GA Government |  | 3 |
| MATH | 1211 | Calculus I | 4 |  |
| PHYS | 2100 | Computer Applications | 3 |  |
| BIOL | 2311K | Botany I | 4 |  |
| **Totals** |  |  | **16** | **15** |
| **Junior Year** |  |  | **Fall** | **Spring** |
| HIST | 1111 | World History I |  | 3 |
| MUSC | 1100 | Music Apprec. or ARAP 1100 Art Apprec. |  | 3 |
| PHYS | 1111K and 1112K | Introduction to Physics I and II | 4 | 4 |
| BIOL | 3101K | Environmental Biology |  | 4 |
| CHEM | 3250K | Biochemistry | 4 |  |
| COMM | 1100 | Anal. Disc. Of Global Issues | 3 |  |
| BIOL | 3501K | Principles of Genetics | 4 |  |
| BIOL |  | Elective |  | 3 |
| **Totals** |  |  | **15** | **17** |
| **Senior Year** |  |  | **Fall** | **Spring** |
| BIOL 4222 Biology Research | | |  | 2 |
| BIOL 4701K Cell and Molecular Biology | | | 4 |  |
| Foreign Language (Spanish, French of German sequence) | | | 3 | 3 |
| NON-Science Electives | | |  | 3 |
| Biology Electives | | | 4 | 4 |
| BIOL 4001 Research and Indep. Study I | | | 1 | 1 |
| Area E Choice | | | 3 | 3 |
| **Totals** | | | **15** | **17** |

**Biology Electives Credit Hrs.**

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| --- | --- | --- | --- |
| **Courses** | **Title** |  | |
| BIOL | 1801 | Science Career Explorations | 1 |
| BIOL | 2113K | Invertebrate Zoology | 3 |
| BIOL | 2312K | General Botany II | 4 |
| BIOL | 2412K | Anatomy and Physiology II | 4 |
| BIOL | 2415 | Scientific Writing | 3 |
| BIOL | 3201K | Entomology | 4 |
| BIOL | 3309K | Plant Anatomy | 3 |
| BIOL | 3311K | Introduction to Natural Resources | 3 |
| BIOL | 3312K | Planning and Managing Natural Resources | 3 |
| BIOL | 3313K | Natural Resources and Environmental Policy | 3 |
| BIOL | 3314K | Use of Energy Resources | 3 |
| BIOL | 3315K | Conservation of Energy Resources | 3 |
| BIOL | 3316K | Sources and Uses of Plant & Wildlife Resources | 3 |
| BIOL | 3317K | Natural Resources and Food Production | 3 |
| BIOL | 3318K | Marine Life Resources | 3 |
| BIOL | 3319K | Conservation of Marine Life Resources | 3 |
| BIOL | 3320K | Principles and Techniques in Water Resource Services | 4 |
| BIOL | 3321K | Conservation of Plant and Wildlife Resources | 3 |
| BIOL | 3401K | Introduction to Histology | 4 |
| BIOL | 3611K | Medical Mycology | 4 |
| BIOL | 3801K | Electron Microscopy | 3 |
| BIOL | 3901 | Pathophysiology | 3 |
| BIOL | 4002 | Research and Independent Study II | 1 |
| BIOL | 4101K | General Physiology | 4 |
| BIOL | 4201K | Introduction to Parasitology | 4 |
| BIOL | 4301K | Developmental Biology | 4 |
| BIOL | 4401K | Comparative Vertebrate Anatomy | 4 |
| BIOL | 4501K | Immunology | 4 |
| BIOL | 4601K | Plant Physiology | 4 |
| BIOL | 4702K | Biotechnology | 4 |

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**Biology**

**Non-Biology Elective**

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|  |  |  |  |
| --- | --- | --- | --- |
| MATH | 2411 | Basic Statistics or | 3 |
| PHYS | 2120 | Applied Math for Sciences I | 3 |

**RECOMMENDED ELECTIVES FOR SPECIFIC CAREER CHOICES I. Graduate School Courses selected in conjunction with advisor.**

**II. Pre-Health Careers (Courses are selected from those listed below).**

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|  |  |  |
| --- | --- | --- |
| BIOL | 3401K | Histology |
| BIOL | 4101K | General Physiology |
| BIOL | 4301K | Developmental Biology |
| BIOL | 4401K | Comp. Vert. Anatomy |

**III. Biological Careers (Botanical Emphasis)**

|  |  |  |
| --- | --- | --- |
| BIOL | 3309K | Plant Anatomy |
| BIOL | 2312K | Botany |
| BIOL | 4601K | Plant Physiology |

**Requirements for a Minor in Biology (Minimum of 20 hours)**

**Business**

Students desiring a minor in Biology are required to complete the following courses:

|  |  |  |  |
| --- | --- | --- | --- |
| BIOL | 2111K and 2112K | General Biology I and II | 8 |
| BIOL | 2311K | General Botany I | 4 |
| BIOL | 3101K | Environmental Biology 4 or appropriate Biology substitute |  |
| BIOL | 4701K | Cell and Molecular Biology | 4 |
| **Total** |  |  | **20** |

**Biology**

Environmental Emphasis (Minor acquired after completion of a minimum of 21 hours)

**Required Courses for a Minor in Natural Resources (9 hours)**

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BIOL |  | 3311K | Introduction to Natural Resources |  | 3 |
| BIOL |  | 3312K | Planning and Managing Natural Resources |  | 3 |
| BIOL |  | 3313K | Natural Resources and Environmental Policy |  | 3 |
| **Four A**  I. | **ddition**  BIOL | **al Courses fro**  3314K | **m Categories I, II, III and IV:**  Use of Energy Resource or | 3 |  |
|  | BIOL | 3315K | Conservation of Energy Resources | 3 |  |
| II. | BIOL BIOL | 3318K  3319K | Marine Life Resources or  Conservation of Marine Life Resources 3 | 3 |  |
| III. | BIOL | 3320K | Principles and Techniques in Water Resources Services | 4 |  |
|  | BIOL | 3316K | Sources and Uses of Plants and Wildlife Resources | 3 |  |
| iv. | BIOL | 3317K | Natural Resources and Food Production | 3 |  |
|  | BIOL | 3321K | Conservation of Plant and Wildlife Resources | 3 |  |

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**BROAD BASED SCIENCE**

**Courses Titles Credit Hrs.**

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16 hours lower division (1000-2000 level)

|  |  |  |  |
| --- | --- | --- | --- |
| PHYS | 1111K | Introductory Physics I | 4 |
| PHYS | 1112K | Introductory Physics II | 4 |
| BIOL | 2111K | Biology I | 4 |
| BIOL | 2112K | Biology II | 4 |
| **Total Hours** |  |  | **16** |

**Major Courses Titles Credit Hrs.**

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|  |  |  |  |
| --- | --- | --- | --- |
| EDUC | 2110 | Invest Critical/Contemporary Issues in Ed. | 3 |
| EDUC | 2120 | Explore Socio. Culture perspective on Diversity in | 3 |
| EDUC | 2130 | Expl Teaching/ Learning | 3 |
| EDUC | 4412 | Student Teaching | 12 |
| EDUC | 4405 | Methods/Material of Teaching Science | 3 |
| EDUC | 4400 | Prep. for Teaching | 2 |
| EDUC | 4441 | Teaching Reading in Sec. Sch. | 3 |
| CHEM | 2301K | Organic Chem I | 4 |
| CHEM | 2302K | Organic Chem II | 4 |
| CHEM | 3250K | Biochemistry | 4 |
| PHYS | 3002 | Advance Earth Space Science | 4 |
| BIOL | 2211K | Intro to Microbiology | 4 |
| BIOL | 3501K | Principle of Genetics | 4 |
| BIOL | 2311K | General Botany I | 4 |
| SPED | 3230 | Contemp. Perspective of Exceptional Students | 3 |
| **Total Hours** |  |  | **60** |



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**EDUCATION BROAD BASED EMPHASIS**

**Freshman Year Fall Spring**

**Arts & Humanities**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ASU | 1200 | Freshman Seminar & Service to Leadership | 3 |  |
| HEDP | 1001 | Introduction to Wellness or PEDH | 1 |
| HIST | 1002 | Intro. to the African Diaspora | 2 |
| ENGL | 1101 | English Composition I | 3 |
| ENGL | 1102 | English Composition II | 3 |
| MATH | 1113 | Pre-Calculus |  | 3 |
| BIOL | 2111K | Biology I | 4 |  |
| BIOL | 2112K | Biology II |  | 4 |
| CHEM | 1211K | General Chemistry I | 4 |  |
| CHEM | 1212K | General Chemistry II | 4 |  |
| EDUC | 2110 | Inves. Critical/Contemporary Issues in Edu. |  | 3 |
| **Totals** |  |  | **16** | **18** |

**Sophomore Year Fall Spring**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ENGL | 2111 | World Literature | 3 |  |
| PEDH | 1002 | Fitness or other choice | 1 |
| MATH | 1211 | Calculus I | 4 |
| BIOL | 2311K | Botany I | 4 |
| EDU | 2120 | Explore Socio. Culture Perspective on Divers. | 3 |
| BIOL | 2211K | General Microbiology | 4 |
| POLS | 1101 | U.S. and GA Government | 3 |
| CHEM | 2301K | Organic Chemistry I | 4 |
| CHEM | 2302K | Organic Chemistry II | 4 |
| EDU | 2130 | Explore Teaching/Learning | 3 |
| PEDH | choice | 100X Physical Education choices | 1 |
| **Totals** |  |  | **16** | **18** |
| **Junior Year** |  |  | **Fall** | **Spring** |
| PHYS | 1111K | Introductory Physics I | 4 |  |
| PHYS | 1112K | Introductory Physics II | 4 |  |
| BIOL | 3501K | Principles of Genetics | 4 |  |
| CHEM | 3250K | Biochemistry | 4 |  |
| COMM | 1100 | Anal. Disc. Of Global Issues | 3 |  |
| Sped | 3230 | Contemp Perspective of Except Students | 3 |  |
| Area C | elective | Fine Arts/ Humanity elective | 3 |  |
| PHYS | 3002 | Adv Earth/ Space Science | 4 |  |
| Area E | elective | Social Science Elective | 3 |  |
| **Total** |  |  | **18** | **14** |

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SPED | 2330 | Exceptional Children | 3 |  |
| MATH | 2411 | Statistics | 3 |
| **Total** |  |  | **6** |
| **Senior Year** |  |  | **Fall** | **Spring** |
| Area E |  | Social Science Elective | 3 |  |
| EDUC | 4400 | Prep. for Teaching | 2 |  |
| EDUC | 4441 | Teaching Reading | 3 |  |
| HIST | 1111 | World History I (or other history elective) | 3 |  |
| EDUC | 4405 | Methods of Teaching Science | 3 |  |
| EDUC | 4412 | Student Teaching | 12 |  |
| **Total** |  |  | **14** | **12** |

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**Chemistry**

**BACHELOR OF SCIENCE DEGREE IN CHEMISTRY**

**Courses Titles Credit Hrs.**

I. Required: 18 hours, lower division (1000-2000 Level)

CHEM 1211K General Chemistry I 4

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CHEM 1212K General Chemistry II 4

CHEM 2301K Organic Chemistry I 4

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CHEM 2302K Organic Chemistry II 4

A 2 hours course taken from Area D for science majors 2

**Total 18**

**Business**

|  |  |  |  |
| --- | --- | --- | --- |
| BIOL | 2111K | Biology I | 4 |
| MATH | 2212 | Calculus II | 4 |
| MATH | 2213 | Calculus III | 4 |
| CHEM | 2351K | Quantitative Analysis I | 4 |
| CHEM | 2352K | Quantitative Analysis II | 4 |
| CHEM | 3221K | Physical Chemistry I | 4 |
| CHEM | 3222K | Physical Chemistry II | 4 |
| CHEM | 3231 | Intermediate Inorganic Chemistry I | 3 |
| CHEM | 3250K | Biochemistry | 4 |
| CHEM | 4100K | Instrumental Analysis | 4 |
| CHEM | 4110 | Chemistry Literature | 1 |
| CHEM | 4111 | Junior Seminar | 1 |
| CHEM | 4120 | Senior Research I | 1 |
| CHEM | 4130K | Senior Research II | 3 |
| PHYS | 2100 | Computer Applications | 3 |

Electives (including at least one 3 hr. class outside the department) 12

**Total 60**

**Education**

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**SCIENCE DEGREE IN CHEMISTRY**

**Freshman Year Fall Spring**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ASU | 1200 | Freshman Seminar & Service to Leadership | 3 |  |
| ENGL | 1101 | English Composition I | 3 |
| ENGL | 1102 | English Composition II |  | 3 |
| MATH | 1113 | Pre-Calculus | 3 |  |
| MATH | 1211 | Calculus I |  | 4 |
| CHEM | 1211K | General Chemistry I | 4 |  |
| CHEM | 1212 K | General Chemistry II |  | 4 |
| PHYS | 2100 | Computer Applications |  | 3 |
| CORE E |  | Social Sciences | 3 |  |
| HIST | 1002 | Intro. to African Diaspora |  | 2 |
| **Totals** |  |  | **16** | **16** |

**Sophomore Year Fall Spring**

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| --- | --- | --- | --- | --- |
| ENGL | 2111 | World Literature I |  | 3 |
| PEDH |  | Physical Education Choice I |  | 1 |
| PHYS | 2221K | Principles of Physics I |  | 4 |
| CHEM | 2301K | Organic Chemistry I | 4 |  |
| CHEM | 2302K | Organic Chemistry II |  | 4 |
| CHEM | 2351K | Quantitative Analysis I | 4 |  |
| CHEM | 2352K | Quantitative Analysis II |  | 4 |
| MATH | 2212 | Calculus II | 4 |  |
| Area C |  | Humanities/Fine Arts | 3 |  |
| PEDH |  | Physical Education Choice I | 1 |  |
| **Total** |  |  | **16** | **16** |

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| --- | --- | --- | --- | --- |
| **Junior Year** |  |  | **Fall** | **Spring** |
| CHEM | 3221K | Physical Chem. I | 4 |  |
| CHEM | 4110 | Chemical Literature | 1 |  |
| Core E |  | Social Sciences (3) I |  | 3 |
| Core E |  | Social Sciences |  | 3 |
| Core E |  | Social Sciences or CHEM 2351K | 3 |  |
| BIOL | 2111K | Biology I |  | 4 |
| MATH | 2213 | Calculus III | 4 |  |
| PHYS | 2222K | Principles of Physics II | 4 |  |
| COMM | 1100 | Fundamentals of Public Speaking | 3 |  |
| PEDH | Choice |  | 1 |  |
| CHEM | 4111 | Junior Seminar I |  | 1 |
| **Total** |  |  | **16** | **15** |
| **Senior Year** | **Fall** | **Spring** |  |  |
| CHEM | 3222K | Physical Chemistry II | 4 |  |
| CHEM | 3231 | Intermediate Inorganic I |  | 3 |
| CHEM | 4100K | Instrumental Analysis |  | 4 |
| CHEM | 4120 | Senior Research I | 1 |  |
| CHEM | 4130K | Senior Research II |  | 3 |
| CHEM | 3250K | Biochemistry | 4 |  |
| Electives | Core F |  | 6 |  |
| Electives | Core F |  |  | 6 |
| **Totals** |  |  | **15** | **16** |
| **Total** |  |  |  | **126 hrs** |

**REQUIRED COURSES FOR A MINOR IN CHEMISTRY**

Minor in Chemistry acquired after completing 20 Semester hours.

|  |  |  |  |
| --- | --- | --- | --- |
| **Courses** |  | **Titles** | **Credit Hrs.** |
| CHEM | 1212K | General Chemistry II | 4 |
| CHEM | 2301K | Organic Chemistry I | 4 |
| CHEM | 2302K | Organic Chemistry II | 4 |
| CHEM | 3250K | Biochemistry | 4 |
| CHEM | 2351K | Quant. Analysis I or other courses depending on bkgrd. | 4 |
| **Total** |  |  | **20** |

**REQUIRED COURSES FOR PRE-ENGINEERING**

**Dual Degree, Chemistry Based**

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course** |  | **Titles** | **Prerequisite** | **Credit Hrs.** |
| MATH | 1211 | Calculus I | MATH 1113 | 4 |
| MATH | 2212 | Calculus I | MATH 1211 | 4 |
| MATH | 2213 | Calculus III | MATH 2212 | 4 |
| PHYS | 2221K | Principles of Physics I | MATH 1211K | 4 |
| PHYS | 2222K | Principles of Physics II | PHYS 2221K | 4 |
| CHEM | 1211K | General Chemistry I |  | 4 |
| CHEM | 1212K | General Chemistry II | CHEM 1211K | 4 |

**Additional Chemistry Hours Needed 9**

ENGL 1101 English Composition I 3

ENGL 1102 English Composition II 3

HIST 2111 Survey of American History I 3

POLS 2101 Introduction to Political Science 3

PEDH Electives 3

Engineering and other courses 14-17

**Total Chemistry Hours In Program 37**

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