# Chemistry, BS - Chemical Physics Concentration

This concentration meets the requirements of the American Chemical Society for certification and is designed for students interested in physicochemical phenomena of atoms, molecules, and condensed matter.

### Chemistry: Chemical Physics Concentration, BS Requirements:

- All students are encouraged to see an advisor after completion of 24 credits.
- Chemistry, Chemical Physics Concentration, BS degree requires 128 credit hours.
- 39 of 128 credit hours must be taken at 300 level or higher (39 credits includes courses taken at the 300+ level in major, minor (if chosen), Pre professional area and electives).
- 12 credit hours of 300 level and above must be taken in the major or 6 credit hours in the major and 6 credit hours in the minor (if chosen).
- 12 of the last 18 credit hours must be taken at UAH, with an overall 25% of coursework taken at UAH.
- Unless otherwise noted a C- or better is required for all College of Science prerequisite courses.
- No more than 64 credit hours from a two-year college can be applied toward a UAH degree.
- For graduation application instructions, see here (http://catalog.uah.edu/undergrad/policies-procedures/application-graduation/).

### Degree Requirements

Charger Foundations Requirements
*Please see Area V for CoS requirements that can also be used to fulfill Charger Foundations Requirements.

| Code | Title | Semester Hours |
|---|---|---|
| **Area I: Freshman Composition** | | **3-6** |
| EH 101 | COLLEGE WRITING I | |
| or EH 101S | COLLEGE WRITING I W/STUDIO | |
| EH 102 | COLLEGE WRITING II | |
| EH 103 | ACCELERATED COLLEGE WRITING | |
| EH 105 | HONORS ENGLISH SEMINAR | |
| **Area II: Humanities and Fine Arts*** | | **12** |
| Fine Arts | | 3 |
| ARH 100 | ARH SURV:ANCIENT-MEDIEVAL | |
| ARH 101 | ARH SURV:RENAISSANCE-MODERN | |
| ARH 103 | ARH SUR: WORLD ART | |
| ARS 160 | DRAWING: FOUNDATIONS | |
| TH 122 | THEATRE APPRECIATION | |
| TH 123 | INTRO TO FILM STUDIES | |
| MU 100 | INTRO TO MUSIC LITERATURE | |
| Literature | | 3-6 |
| EH 207 | READINGS LITERATURE/CULTURE I | |
| EH 208 | READINGS LITERATURE/CULTURE 2 | |
| EH 209 | HONORS SEM READINGS LIT/CUL I | |
| EH 210 | HONORS SEM READINGS LIT/CUL 2 | |
| EH 242 | MYTHOLOGY | |
| Humanities and Fine Arts | | 3-6 |
| CM 113 | Intro to Rhetorical Communication | |
| WLC 101S | INTRO FOREIGN LANG I: SPANISH | |
| or WLC 101A | INTRO FOREIGN LANG I: ARABIC | |
| or WLC 101F | INTRO FOREIGN LANG I:FRENCH | |
| or WLC 101G | INTRO FOREIGN LANG I:GERMAN | |
| or WLC 101J | INTRO FOREIGN LANG I:JAPANESE | |
| or WLC 101R | INTRO FOREIGN LANG I:RUSSIAN | |
| WLC 102S | INTRO FOREIGN LANG II:SPANISH | |
| or WLC 102A | INTRO FOREIGN LANG II: ARABIC | |

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|---|---|---|
| or WLC 102F | INTRO FOREIGN LANG II:FRENCH | |
| or WLC 102G | INTRO FOREIGN LANG II:GERMAN | |
| or WLC 102J | INTRO FOREIGN LANG II:JAPANESE | |
| or WLC 102R | INTRO FOREIGN LANG II:RUSSIAN | |
| WLC 201S | INTERM FOREIGN LANG:SPANISH | |
| or WLC 201A | INTERM FOREIGN LANG I: ARABIC | |
| or WLC 201F | INTERM FOREIGN LANG:FRENCH | |
| or WLC 201G | INTERM FOREIGN LANG:GERMAN | |
| or WLC 201J | INTERM FOREIGN LANG: JAPANESE | |
| or WLC 201R | INTERM FOREIGN LANG:RUSSIAN | |
| WLC 202S | INTERM FOREIGN LANG II:SPANISH | |
| or WLC 202A | INTERM FOREIGN LANG II: ARABIC | |
| or WLC 202F | INTERM FOREIGN LANG II:FRENCH | |
| or WLC 202G | INTERM FOREIGN LANG II:GERMAN | |
| or WLC 202J | INTERM FORGN LANG II:JAPANESE | |
| or WLC 202R | INTERM FOREIGN LANG II:RUSSIAN | |
| WLC 204 | INTERNATIONAL CINEMA | |
| PHL 101 | INTRODUCTION TO PHILOSOPHY | |
| PHL 102 | INTRO TO ETHICS | |
| PHL 103 | INTRODUCTION TO LOGIC | |
| PHL 150 | TECH, SCIENCE & HUMAN VALUES | |
| WGS 200 | INTRO WOMEN'S & GENDER STUDIES | |
| AMS 229 | ANCIENT & MEDIEVAL WORLDS | |
| ARH 100 | ARH SURV:ANCIENT-MEDIEVAL | |
| ARH 101 | ARH SURV:RENAISSANCE-MODERN | |
| ARH 103 | ARH SUR: WORLD ART | |
| ARS 160 | DRAWING: FOUNDATIONS | |
| TH 122 | THEATRE APPRECIATION | |
| TH 123 | INTRO TO FILM STUDIES | |
| MU 100 | INTRO TO MUSIC LITERATURE | |
| **Area III: Mathematics and Sciences** | | **11-12** |
| Mathematics | | 3-4 |
| MA 105 | NATURE OF MATHEMATICS | |
| MA 107 | ALGEBRA WITH APPLICATIONS | |
| MA 110 | FINITE MATHEMATICS | |
| MA 112 | PRECALCULUS ALGEBRA | |
| MA 113 | PRECALCULUS TRIGONOMETRY | |
| MA 115 | PRECALCULUS ALGEBRA & TRIG | |
| MA 120 | MATH PROFESSIONAL APPLICATIONS | |
| MA 171 | CALCULUS A | |
| Natural Sciences (Lab) | | 8 |
| AST 100 | SURVEY OF ASTRONOMY | |
| AST 106 | EXPLORING THE COSMOS I | |
| AST 107 | EXPLORING THE COSMOS II | |
| BYS 109 | FUNDAMENTALS OF BIOLOGY | |
| BYS 119 | PRINCIPLES OF BIOLOGY | |
| BYS 120 | ORGANISMAL BIOLOGY | |
| BYS 215 | HUMAN ANATOMY & PHYSIOLOGY I | |
| CH 101<br>& CH 105 | INTRO TO CHEMISTRY<br>and INTRO CHEMISTRY LAB | |
| CH 121<br>& CH 125 | GENERAL CHEMISTRY I<br>and GENERAL CHEMISTRY LAB I | |

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| CH 123<br>& CH 126 | GENERAL CHEMISTRY II<br>and GENERAL CHEMISTRY LAB II | |
| CH 151<br>& CH 105 | GENERAL, ORGANIC, BIOCHEMISTRY<br>and INTRO CHEMISTRY LAB | |
| ESS 103 | ENVIRONMENTAL EARTH SCIENCE | |
| ESS 111 | WEATHER, CLIMATE & GLOBAL CHNG | |
| PH 100 | CONCEPTUAL PHYSICS | |
| PH 101 | GENERAL PHYSICS I | |
| PH 102 | GENERAL PHYSICS II | |
| PH 111<br>& PH 114 | GEN PHYSICS W/CALCULUS I<br>and GENERAL PHYSICS LAB I | |
| PH 112<br>& PH 115 | GEN PHYSICS W/CALC II<br>and GENERAL PHYSICS LAB II | |
| PH 113<br>& PH 116 | GEN PHYSICS W/CALC III<br>and GENERAL PHYSICS LAB III | |
| **Area IV: History and Social and Behavioral Sciences*** | | **12** |
| History | | 3-6 |
| HY 103 | WORLD HISTORY TO 1500 | |
| HY 104 | WORLD HISTORY SINCE 1500 | |
| HY 221 | UNITED STATES TO 1877 | |
| HY 222 | UNITED STATES SINCE 1877 | |
| Social and Behavioral Sciences | | 6-9 |
| ECN 142 | PRINC OF MACROECONOMICS | |
| ECN 143 | PRINC OF MICROECONOMICS | |
| GS 200 | GLOBAL SYSTEMS AND CULTURES | |
| ESS 105 | WORLD REGIONAL GEOGRAPHY | |
| ESS 110 | PRINCIPLES OF HUMAN GEOGRAPHY | |
| PSC 101 | INTRO TO AMERICAN GOVERNMENT | |
| PSC 102 | INTRO TO COMPARATIVE POLITICS | |
| PSC 260 | INTRODUCTION TO INTERNATIONAL RELATIONS | |
| PY 101 | GENERAL PSYCHOLOGY I | |
| PY 201 | LIFE-SPAN DEVELOPMENT | |
| SOC 100 | INTRO TO SOCIOLOGY | |
| SOC 102 | ANALYSIS OF SOCIAL PROBLEMS | |
| SOC 103 | INTRO TO CRIMINOLOGY | |
| SOC 105 | | |

* Take either 1 EH (Area II) + 2 HY (Area IV) <OR> 2 EH (Area II) + 1 HY (Area IV). Take no more than six hours in a single discipline in Area II or Area IV.

Area V: Pre Professional Requirements

| Code | Title | Semester Hours |
|---|---|---|
| Courses in this area may also be used to fulfill Charger Foundations requirements | | |
| **Communications** | | **3** |
| CM 113 | Intro to Rhetorical Communication | |
| **Biology** | | **8** |
| BYS 119<br>& 119L<br>& 119R | PRINCIPLES OF BIOLOGY<br>and LABORATORY<br>and RECITATION | |
| BYS 120<br>& 120L<br>& 120R | ORGANISMAL BIOLOGY<br>and ORGANISMAL BIOLOGY LAB<br>and RECITATION | |
| **Math** | | **18** |

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|---|---|---|
| MA 171 | CALCULUS A | |
| MA 172 | CALCULUS B | |
| MA 201 | CALCULUS C | |
| MA 238 | APPL DIFFERENTIAL EQUATIONS | |
| MA 244 | INTRO TO LINEAR ALGEBRA | |
| **Physics** | | **18** |
| (Note: take one additional 300+ Physics course (3 cr.) if a PH minor is desired.) | | 10 |
| PH 110 | FRONTIERS IN SCIENCE | |
| PH 111<br>& PH 114 | GEN PHYSICS W/CALCULUS I<br>and GENERAL PHYSICS LAB I | |
| PH 112<br>& PH 115 | GEN PHYSICS W/CALC II<br>and GENERAL PHYSICS LAB II | |
| PH 113<br>& PH 116 | GEN PHYSICS W/CALC III<br>and GENERAL PHYSICS LAB III | |
| PH 499 | PHYSICS PRACTICUM | |
| **Computer Science: Choose one** | | **3** |
| CS 100 | INTRO COMPUTERS & PROGRAM | |
| or CS 102 | INTRO TO C PROGRAMMING | |
| or CS 103 | INTRO PROGRAMMING USING JAVA | |
| or CS 104 | INTRO TO CS USING PYTHON | |
| **Technical Writing** | | **3** |
| EH 301 | TECHNICAL WRITING | |

Major Requirements

| Code | Title | Semester Hours |
|---|---|---|
| **Chemistry** | | **25** |
| CH 123<br>& CH 126 | GENERAL CHEMISTRY II<br>and GENERAL CHEMISTRY LAB II | |
| CH 121<br>& CH 125 | GENERAL CHEMISTRY I<br>and GENERAL CHEMISTRY LAB I | |
| CH 223<br>& CH 224 | QUANTITATIVE ANALYSIS<br>and QUANTITATIVE ANALYSIS LAB | |
| CH 331<br>& CH 335 | ORGANIC CHEMISTRY I<br>and ORGANIC CHEMISTRY LAB I [5] | |
| CH 332 | ORGANIC CHEMISTRY II [5] | |
| CH 361 | GENERAL BIOCHEMISTRY | |
| CH 401 | INORGANIC CHEMISTRY | |
| **Chemical Physics Courses** | | **16-18** |
| CH 336 | ORGANIC CHEMISTRY LAB II [5] | |
| CH 341<br>& CH 345 | PHYSICAL CHEMISTRY I<br>and EXPERIMENTAL PHYSICAL CHEM I | |
| CH 342<br>& CH 346 | PHYSICAL CHEMISTRY II<br>and EXPERIMENTAL PHYSICAL CHEM II | |
| CH 362 | GENERAL BIOCHEMISTRY LAB | |
| CH 402 | INORGANIC CHEMISTRY LAB | |
| CH 421 | INSTRUMENTAL ANALYSIS | |
| CH 491 | INTRO TO CHEMICAL RESEARCH | |
| or CH 492 | INTRO TO CHEMICAL RESEARCH | |
| or CH 493 | INTRO TO CHEMICAL RESEARCH | |

Elective Requirements

| Code | Title | Semester Hours |
|---|---|---|
| **Elective Courses** | | **5-7** |
| Additional elective courses, 100+ level, to reach 128 credits. Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credits of 100 level HPE courses can count toward degree requirements. | | |

Overall Requirements

| Code | Title | Semester Hours |
|---|---|---|
| All College of Science degrees must have at least 128 credits. | | |
| At least 39 of the 128 credits must be at the 300+ level. These may be taken in any area including electives. | | |

1 Students must take one literature and one history course. Students must also take either a second literature or history course to complete a sequence. Acceptable Literature sequences must include one early literature (EH 207 or EH 242 or EH 209) and one later literature (EH 208 or EH 210). Acceptable history sequences are (HY 103 + HY 104), or (HY 221 + HY 222)

2 Based on Math placement (http://www.uah.edu/science/departments/math/undergraduate-students/placement/), prerequisite (MA 112 and/or MA 113) Mathematics courses may be required.

3 No more than 6 hours can be taken in a single discipline.

4 For choices see the World Languages and Cultures (http://catalog.uah.edu/undergrad/colleges-departments/arts-humanities-social-sciences/foreign-languages-literatures/#coursestext) department.

5 Courses in organic chemistry completed at the 2-year college level may be used to satisfy semester hour and prerequisite requirements for upper level chemistry courses at UAH but do not count toward the 300-level requirements of the minor.

### Sample four year plan for Chemistry, Chemical Physics Concentration BS degree:

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Note: This is only an example and variations are possible.
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| **Year 1** | | |
| **Fall** | | **Semester Hours** |
| FYE 101S | CHARGER SUCCESS - SCIENCE | 1 |
| EH 101 | COLLEGE WRITING I | 3 |
| CH 121<br>& CH 125 | GENERAL CHEMISTRY I<br>and GENERAL CHEMISTRY LAB I | 4 |
| MA 171 | CALCULUS A | 4 |
| PH 110 | FRONTIERS IN SCIENCE | 3 |
| Fine art | | 3 |
| See Requirements tab for approved list. | | |
| | Term Semester Hours: | 18 |
| **Spring** | | |
| EH 102 | COLLEGE WRITING II | 3 |
| CH 123<br>& CH 126 | GENERAL CHEMISTRY II<br>and GENERAL CHEMISTRY LAB II | 4 |
| MA 172 | CALCULUS B | 4 |
| BYS 119<br>& 119L<br>& 119R | PRINCIPLES OF BIOLOGY<br>and LABORATORY<br>and RECITATION | 4 |
| | Term Semester Hours: | 15 |
| **Year 2** | | |
| **Fall** | | |
| CH 331<br>& CH 335 | ORGANIC CHEMISTRY I<br>and ORGANIC CHEMISTRY LAB I | 4 |
| PH 111<br>& PH 114 | GEN PHYSICS W/CALCULUS I<br>and GENERAL PHYSICS LAB I | 4 |
| MA 201 | CALCULUS C | 4 |

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|---|---|---|
| BYS 120<br>& 120L<br>& 120R | ORGANISMAL BIOLOGY<br>and ORGANISMAL BIOLOGY LAB<br>and RECITATION | 4 |
| | Term Semester Hours: | 16 |
| **Spring** | | |
| CH 332<br>& CH 336 | ORGANIC CHEMISTRY II<br>and ORGANIC CHEMISTRY LAB II | 4 |
| CH 223<br>& CH 224 | QUANTITATIVE ANALYSIS<br>and QUANTITATIVE ANALYSIS LAB | 4 |
| PH 112<br>& PH 115 | GEN PHYSICS W/CALC II<br>and GENERAL PHYSICS LAB II | 4 |
| MA 238 | APPL DIFFERENTIAL EQUATIONS | 3 |
| | Term Semester Hours: | 15 |
| **Year 3** | | |
| **Fall** | | |
| CH 341<br>& CH 345 | PHYSICAL CHEMISTRY I<br>and EXPERIMENTAL PHYSICAL CHEM I | 4 |
| PH 113<br>& PH 116 | GEN PHYSICS W/CALC III<br>and GENERAL PHYSICS LAB III | 4 |
| MA 244 | INTRO TO LINEAR ALGEBRA | 3 |
| CS 100 | INTRO COMPUTERS PROGRAM | 3 |
| or CS 102 | or INTRO TO C PROGRAMMING | |
| or CS 103 | or INTRO PROGRAMMING USING JAVA | |
| or CS 104 | or INTRO TO CS USING PYTHON | |
| Social and Behavioral science | | 3 |
| See Requirements tab for approved list. | | |
| | Term Semester Hours: | 17 |
| **Spring** | | |
| CH 342<br>& CH 346 | PHYSICAL CHEMISTRY II<br>and EXPERIMENTAL PHYSICAL CHEM II | 4 |
| CH 361<br>& CH 362 | GENERAL BIOCHEMISTRY<br>and GENERAL BIOCHEMISTRY LAB | 4 |
| PH 251 | SPECIAL RELATIVITY | 1 |
| CM 113 | Intro to Rhetorical Communication | 3 |
| Social and Behavioral science | | 3 |
| See Requirements tab for approved list. | | |
| | Term Semester Hours: | 15 |
| **Year 4** | | |
| **Fall** | | |
| CH 401 | INORGANIC CHEMISTRY | 3 |
| CH 421 | INSTRUMENTAL ANALYSIS | 4 |
| PH 300+ level or higher course | | 3 |
| EH 301 | TECHNICAL WRITING | 3 |
| History | | 3 |
| See Requirements tab for approved list. | | |
| | Term Semester Hours: | 16 |
| **Spring** | | |
| CH 402 | INORGANIC CHEMISTRY LAB | 1 |
| CH 493 | INTRO TO CHEMICAL RESEARCH | 3 |

| | | |
|---|---|---|
| or CH 491 | or INTRO TO CHEMICAL RESEARCH | |
| or CH 492 | or INTRO TO CHEMICAL RESEARCH | |
| PH 300+ level or higher course | | 3 |
| Literature | | 3 |
| See Requirements tab for approved list. | | |
| 2nd History or 3rd Social and Behavioral science | | 3 |
| See Requirements tab for approved list. | | |
| Humanities, 2nd Fine art or 2nd Literature | | 3 |
| See Requirements tab for approved list. | | |
| | Term Semester Hours: | 16 |
| | Total Semester Hours: | 128 |