

## BACHELOR OF SCIENCE IN BIOCHEMISTRY

In pursuing the [Bachelor of Science in Biochemistry](#), students will first build a strong foundation in general chemistry, general biology, physical, and organic chemistry prior to choosing directed and professional electives that will allow them the flexibility to pursue topics that will be relevant to their future career tracks in biochemistry, biotechnology, chemistry or health.

### *Required Courses*

|         |                                |   |
|---------|--------------------------------|---|
| APM 205 | Calculus I:Science & Engr      | 4 |
| APM 206 | Calculus II:Science & Engr     | 4 |
| EFB 101 | Gen Bio I:Organismal Bio&Ecol  | 3 |
| EFB 102 | General Biology I Laboratory   | 1 |
| EFB 103 | Gen Bio II:Cell Bio & Genetics | 3 |
| EFB 104 | General Biology II Laboratory  | 1 |
| EWP 190 | Writing And The Envrnment      | 3 |
| EWP 290 | Research Writing & Humanities  | 3 |
| ESF 200 | Information Literacy           | 1 |
| FCH 132 | Orientation Seminar:FCH        | 1 |
| FCH 150 | General Chemistry I            | 3 |
| FCH 151 | General Chemistry I Lab        | 1 |
| FCH 152 | General Chemistry II           | 3 |
| FCH 153 | General Chemistry II Lab       | 1 |
| FCH 221 | Organic Chemistry 1            | 3 |
| FCH 222 | Organic Chemistry Lab 1        | 1 |
| FCH 223 | Organic Chemistry II           | 3 |
| FCH 224 | Organic Chemistry Lab II       | 1 |
| FCH 232 | Career Skills for Chemists     | 1 |
| EPH 201 | Calculus Based Physics I       | 3 |
| EPH 202 | Calculus Based Physics I Lab   | 1 |

|         |                               |   |
|---------|-------------------------------|---|
| EPH 203 | Calculus Based Physics II     | 3 |
| EPH 204 | Calculus Based Physics II Lab | 1 |

## Elective

| Course Name                                                                                                                                                                | Codes* | Credits |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| Math Elective (Calculus III [APM307] or Statistics [APM210])                                                                                                               |        | 3       |
| Free Elective                                                                                                                                                              |        | 9       |
| General Education Course in two of the following categories: US History & Civic Engagement, The Arts, Social Sciences, World History and Global Awareness, World Languages |        | 6       |
| General Education Course in Diversity, Equity, Inclusion and Social Justice                                                                                                | G      | 3       |

### *Upper Division Required Courses*

|         |                                |   |
|---------|--------------------------------|---|
| EFB 307 | Principles Of Genetics         | 3 |
| EWP 407 | Writing/Env & Sci Professionls | 3 |
| FCH 360 | Physical Chemistry I           | 3 |
| FCH 361 | Physical Chemistry II          | 3 |
| FCH 380 | Analytical Chemistry I         | 2 |
| FCH 382 | Analytical Chemistry I Lab     | 1 |
| FCH 430 | Biochemistry I                 | 3 |
| OR      |                                |   |
| FCH 530 | Biochemistry I                 | 3 |
| FCH 431 | Biochemistry Laboratory        | 3 |
| OR      |                                |   |
| FCH 531 | Biochemistry Laboratory        | 3 |
| FCH 432 | Biochemistry II                | 3 |

|               |                         |   |
|---------------|-------------------------|---|
| OR<br>FCH 532 | Biochemistry II         | 3 |
| FCH 495       | Intro/Professional Chem | 1 |
| FCH 497       | Undergraduate Seminar   | 1 |

## Upper Division Electives

Students will take 24 credits of Professional Electives.

1. At least one Professional Elective must have a laboratory component. This course can also count as a Biochemistry-focused Elective if chosen from one of the laboratory courses listed below.
2. At least one Professional Elective must be a biology (EFB or BIO) course and at least one Professional Elective must be a chemistry (FCH or CHE) course. These courses can also count as biochemistry- focused professional electives if chosen from the list below.
3. Of the 24 credits of Professional Electives, at least 12 credits must be chosen from the following short list of biochemistry-focused professional electives.

*Coursework suitable for meeting the biochemistry-focused professional electives:*

|         |                              |       |
|---------|------------------------------|-------|
| BIO 409 | General Microbiology         | 0 - 8 |
| BTC 401 | Molecular Biol Techniques    | 3     |
| EFB 303 | Intro Envrn Microbiology     | 4     |
| EFB 308 | Prin Of Genetics Lab         | 1     |
| EFB 325 | Cell Biology                 | 3     |
| EFB 400 | Toxic Health Hazards         | 3     |
| EFB 462 | Animal Physiol:Envrn&Ecol    | 4     |
| FCH 325 | Organic Chemistry III        | 4     |
| FCH 390 | Drugs From The Wild          | 3     |
| FCH 410 | Inorganic Chemistry          | 3     |
| FCH 498 | Introduction To Research     | 1 - 5 |
| FCH 524 | Topics Nat Product Chem      | 3     |
| FCH 584 | Spectro ID/Organic Compounds | 3     |
| CHE 412 | Metals in Medicine           | 0 - 8 |
| CHE 414 | Intro to Medicinal Chemistry | 0 - 8 |

|                                                                                                         |                                 |       |
|---------------------------------------------------------------------------------------------------------|---------------------------------|-------|
| CHE 427                                                                                                 | Org Chem of Biological Molecul  | 0 - 8 |
| CHE 474                                                                                                 | Structural&Physical Biochem     | 0 - 8 |
| CHE<br>OR<br>BCM 477                                                                                    | Proteins and Nucleic Acids Lab  | 0 - 8 |
| (list not exhaustive; any science, math, or engineering course at least 300-level counts as PE)         |                                 |       |
| <i>Suggested other Professional Electives (PEs) not considered as a biochemistry-focused electives:</i> |                                 |       |
| BIO 355                                                                                                 | General Physiology              | 0 - 8 |
| BIO 422                                                                                                 | Bioinformatics for Life Scient  | 0 - 8 |
| BIO 464                                                                                                 | Applied Biotechnology           | 0 - 8 |
| BTC 425                                                                                                 | Plant Biotechnology             | 3     |
| BTC 426                                                                                                 | Plant Tissue Culture Methods    | 3     |
| BPE 300                                                                                                 | Intro/Industrial Bioprocessing  | 3     |
| BPE 420                                                                                                 | Bioseparations                  | 3     |
| BPE 421                                                                                                 | Bioprocess EngineerofReactions  | 3     |
| BPE 440                                                                                                 | Bioproc Kinetics&Sys Engr Lab   | 3     |
| BPE 481                                                                                                 | Bioprocess Eng Design           | 3     |
| EFB 303                                                                                                 | Intro Envrn Microbiology        | 4     |
| EFB 311                                                                                                 | Principles of Evolution         | 3     |
| EFB 320                                                                                                 | General Ecology                 | 4     |
| EFB 400                                                                                                 | Toxic Health Hazards            | 3     |
| EFB 415                                                                                                 |                                 |       |
| EFB 435                                                                                                 | Flowering Plnts:Div,Evol&System | 3     |
| EFB 462                                                                                                 | Animal Physiol:Envrn&Ecol       | 4     |
| EFB 570                                                                                                 | Insect Physiology               | 3     |
| FCH 296                                                                                                 | Special Topics in Chemistry     | 1 - 3 |
| FCH 381                                                                                                 | Analytical Chemistry II         | 3     |

|         |                           |       |
|---------|---------------------------|-------|
| FCH 496 | Special Problems In Chem  | 1 - 3 |
| FCH 510 | Environmental Chemistry I | 3     |
| FCH 511 | Atmospheric Chemistry     | 3     |
| FCH 515 | Meth/Envrn Chem Analysis  | 3     |
| FCH 520 |                           |       |
| FCH 525 | Oceanography              | 3     |
| FCH 550 | Polymer Sci:Synth&Mech    | 3     |
| FCH 551 | Polymer Techniques        | 3     |
| FCH 552 | Polymer Sci:Prop&Tech     | 3     |
| FCH 560 |                           |       |
| PSE 223 | Intro to Lignocellulosics | 4     |

**Total Minimum Credits For Degree: 120**

\*Syracuse University course. Additional course fee may apply.

