

# BIOCHEMISTRY, BS (CALS)

## REQUIREMENTS

### UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext>) section of the *Guide*.

General Education	• Breadth–Humanities/Literature/Arts: 6 credits
	• Breadth–Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
	• Breadth–Social Studies: 3 credits
	• Communication Part A & Part B *
	• Ethnic Studies *
	• Quantitative Reasoning Part A & Part B *

\* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

### COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies, Science, and Capstone), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

### COLLEGE REQUIREMENTS FOR ALL CALS BS DEGREE PROGRAMS

Code	Title	Credits
Quality of Work: Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.		

Residency: Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.

first year seminar/ (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biochemistry/calsfirstyearseminarcourses/>) 1

international studies/ (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biochemistry/calsinternationalstudiescourses/>) 3

Physical science fundamentals 4–5

CHEM 103	General Chemistry I	
or CHEM 108	Chemistry in Our World	
or CHEM 109	Advanced General Chemistry	

Biological science 5

Additional science (biological, physical, or natural) 3

Science breadth (biological, physical, natural, or social) 3

cals capstone learning experience: included in the requirements for each cals major (see “major requirements”)/ (<http://guide.wisc.edu/undergraduate/agricultural-life-sciences/biochemistry/calscapstonerequirement/>)

### REQUIREMENTS FOR THE MAJOR MATHEMATICS

#### Mathematics Requirements

Code	Title	Credits
Complete one of the following options:		
MATH 221 & MATH 222	Calculus and Analytic Geometry 1 and Calculus and Analytic Geometry 2	9
MATH 171 & MATH 217 & MATH 222	Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II and Calculus and Analytic Geometry 2	14

### CHEMISTRY

#### General Chemistry

Code	Title	Credits
Complete one of the following options:		
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	9
CHEM 109	Advanced General Chemistry	5
CHEM 115 & CHEM 116	Chemical Principles I and Chemical Principles II (satisfies both general and analytical chemistry requirements)	10

#### Organic Chemistry

Code	Title	Credits
Complete ALL of the following courses:		
CHEM 343	Organic Chemistry I	3
CHEM 345	Organic Chemistry II	3

CHEM 344	Introductory Organic Chemistry Laboratory	2
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## Analytical Chemistry

Code	Title	Credits
Complete one of the following options:		
CHEM 327	Fundamentals of Analytical Science	4
CHEM 329	Fundamentals of Analytical Science	4
CHEM 115 & CHEM 116	Chemical Principles I and Chemical Principles II (satisfies both general and analytical chemistry requirements)	10

## Physical Chemistry

Code	Title	Credits
Complete one:		
CHEM 665	Biophysical Chemistry (Recommended)	3
CHEM 561 & CHEM 563	Physical Chemistry and Physical Chemistry Laboratory I	4

## BIOLOGY

Students must complete either Option A (introductory + upper-level biology), or Option B (biocore), for 16 total credits of biological science coursework.

### Option A (Introductory and Upper-Level Biology) Option A Introductory Biology

Code	Title	Credits
Complete one of the following introductory biology options:		
BIOLOGY/BOTANY/ZOOLOGY 151 & BIOLOGY/BOTANY/ZOOLOGY 152	Introductory Biology and Introductory Biology (recommended)	10
BIOLOGY/ZOOLOGY 101 & BIOLOGY/ZOOLOGY 102 & BOTANY/BIOLOGY 130	Animal Biology and Animal Biology Laboratory and General Botany	10

### And Option A Upper-Level Biology

At least 6 credits of upper-level biological science coursework are required (to achieve 16 total credits—more than 6 credits may be required if introductory biology totals less than 10 credits due to transfer credits). Select from the course list below. To see courses offered in specific upcoming semesters, please see the biochemistry website ([https://biochem.wisc.edu/undergraduate\\_program/advanced-biology-courses-undergraduate-program/](https://biochem.wisc.edu/undergraduate_program/advanced-biology-courses-undergraduate-program/)).

**Important:** A course may not double count in both the "upper-level biology" and the "biochemistry" requirements for the major. Biochemistry courses on this list can count only for "upper-level biology" if they are above-and-beyond what is needed to fulfill the "biochemistry" portion of the major. For example, if students have taken BIOCHEM 501, they will need

one advanced biochemistry elective to fulfill the biochemistry requirement, and then any additional biochemistry courses taken can count for upper-level biology.

Code	Title	Credits
ANAT&PHY 335	Physiology	5
ANAT&PHY 337	Human Anatomy	3
ANAT&PHY 435	Fundamentals of Human Physiology	5
AGRONOMY 300	Cropping Systems	3
AGRONOMY 302	Forage Management and Utilization	3
AGRONOMY/HORT/SOIL SCI 326	Plant Nutrition Management	3
AGRONOMY/HORT 338	Plant Breeding and Biotechnology	3
AGRONOMY/BOTANY/HORT 339	Plant Biotechnology: Principles and Techniques I	4
AGRONOMY/BOTANY/HORT 340	Plant Cell Culture and Genetic Engineering	3
AGRONOMY/A A E/ NUTR SCI 350	World Hunger and Malnutrition	3
AGRONOMY/BOTANY/SOIL SCI 370	Grassland Ecology	3
AGRONOMY 377	Global Food Production and Health	3
AGRONOMY/HORT 501	Principles of Plant Breeding	3
AGRONOMY/ATM OCN/SOIL SCI 532	Environmental Biophysics	3
AN SCI/FOOD SCI 305	Introduction to Meat Science and Technology	4
AN SCI/DY SCI/ NUTR SCI 311	Comparative Animal Nutrition	3
AN SCI 314	Poultry Nutrition	3
AN SCI/DY SCI 320	Animal Health and Disease	3
AN SCI/DY SCI 361	Introduction to Animal and Veterinary Genetics	2
AN SCI/DY SCI 362	Veterinary Genetics	2
AN SCI/DY SCI 363	Principles of Animal Breeding	2
AN SCI/DY SCI 370	Livestock Production and Health in Agricultural Development	3
AN SCI/DY SCI 414	Ruminant Nutrition & Metabolism	3
AN SCI 415	Application of Monogastric Nutrition Principles	2
AN SCI 431	Beef Cattle Production	3
AN SCI 432	Swine Production	3
AN SCI/DY SCI 434	Reproductive Physiology	3
AN SCI 503	Avian Physiology	3
AN SCI 508	Poultry Products Technology	3
AN SCI 511	Breeder Flock and Hatchery Management	3
AN SCI 512	Management for Avian Health	3
AN SCI/FOOD SCI 515	Commercial Meat Processing	2
AN SCI/F&W ECOL/ ZOOLOGY 520	Ornithology	3

AN SCI/F&W ECOL/ ZOOLOGY 521	Birds of Southern Wisconsin	3	BOTANY/ PL PATH 332	Fungi	4
AN SCI 610	Quantitative Genetics	3	BOTANY/ AGRONOMY/ HORT 339	Plant Biotechnology: Principles and Techniques I	4
AN SCI/ NUTR SCI 626	Experimental Diet Design	1	BOTANY 400	Plant Systematics	4
B M E/MED PHYS/ PHMCOL- M/PHYSICS/ RADIOL 619	Microscopy of Life	3	BOTANY 401	Vascular Flora of Wisconsin	4
BIOCHEM/ NUTR SCI 510	Nutritional Biochemistry and Metabolism	3	BOTANY/ F&W ECOL 402	Dendrology: Woody Plant Identification and Ecology	3
BIOCHEM/ NUTR SCI 560	Principles of Human Disease and Biotechnology	2	BOTANY/ANTHRO/ ZOOLOGY 410	Evolutionary Biology	3
BIOCHEM 570	Computational Modeling of Biological Systems	3	BOTANY 422	Plant Geography	3
BIOCHEM/ M M & I 575	Biology of Viruses	2	BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin	4
BIOCHEM 601	Protein and Enzyme Structure and Function	2	BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology	4
BIOCHEM/B M I/ BMOLCHEM/ MATH 609	Mathematical Methods for Systems Biology	3	BOTANY/ENTOM/ ZOOLOGY 473	Plant-Insect Interactions	3
BIOCHEM/ GENETICS/ MICROBIO 612	Prokaryotic Molecular Biology	3	BOTANY/AMER IND/ ANTHRO 474	Ethnobotany	3-4
BIOCHEM/ NUTR SCI 619	Advanced Nutrition: Intermediary Metabolism of Macronutrients	3	BOTANY 500	Plant Physiology	3-4
BIOCHEM/ GENETICS/ MD GENET 620	Eukaryotic Molecular Biology	3	BOTANY/ENTOM/ PL PATH 505	Plant-Microbe Interactions: Molecular and Ecological Aspects	3
BIOCHEM/ BOTANY 621	Plant Biochemistry	3	BOTANY/ PL PATH 563	Phylogenetic Analysis of Molecular Data	3
BIOCHEM 625	Mechanisms of Action of Vitamins and Minerals	2	BOTANY/HORT/ SOIL SCI 626	Mineral Nutrition of Plants	3
BIOCHEM/ NUTR SCI 645	Molecular Control of Metabolism and Metabolic Disease	3	BOTANY/ENVIR ST/ F&W ECOL/ ZOOLOGY 651	Conservation Biology	3
BSE 349	Quantitative Techniques for Biological Systems	3	BOTANY/ GENETICS/M M & I/ PL PATH 655	Biology and Genetics of Fungi	3
BSE 364	Engineering Properties of Food and Biological Materials	3	BOTANY/ LAND ARC 670	Adaptive Restoration Lab	2
BSE 365	Measurements and Instrumentation for Biological Systems	3	CHEM 575	Advanced Topics in Chemistry (Topics in Chemical Biology)	1-4
BSE/ENVIR ST 367	Renewable Energy Systems	3	CRB 625	Stem Cell Seminar	1
BSE 460	Biorefining: Energy and Products from Renewable Resources	3	CRB 640	Fundamentals of Stem Cell and Regenerative Biology	3
BSE 461	Food and Bioprocessing Operations	3	CRB 650	Molecular and Cellular Organogenesis	3
BSE 472	Sediment and Bio-Nutrient Engineering and Management	3	DY SCI 378	Lactation Physiology	3
BMOLCHEM/ MICROBIO 668	Microbiology at Atomic Resolution	3	DY SCI 535	Dairy Farm Management Practicum	3
B M I/STAT 541	Introduction to Biostatistics	3	ENTOM/ ZOOLOGY 302	Introduction to Entomology	4
B M I/ COMP SCI 576	Introduction to Bioinformatics	3	ENTOM 321	Physiology of Insects	3
BOTANY 300	Plant Anatomy	4	ENTOM 331	Taxonomy of Mature Insects	4
BOTANY 305	Plant Morphology and Evolution	4	ENTOM 351	Principles of Economic Entomology	3
BOTANY 330	Algae	3	ENTOM/ ZOOLOGY 371	Medical Entomology	3
			ENTOM 432	Taxonomy and Bionomics of Immature Insects	4
			ENTOM/ F&W ECOL 500	Insects in Forest Ecosystem Function and Management	2

ENTOM/ ZOOLOGY 540	Theoretical Ecology	3	F&W ECOL/ AGRONOMY/ ENTOM/ M&ENVTOX 634	Ecotoxicology: Impacts on Populations, Communities and Ecosystems	1
ENTOM/GENETICS/ ZOOLOGY 624	Molecular Ecology	3	F&W ECOL/ A A E 652	Decision Methods for Natural Resource Managers	3
ENVIR ST/ LAND ARC 361	Wetlands Ecology	3	F&W ECOL 655	Animal Population Dynamics	3
ENVIR ST/ POP HLTH 471	Introduction to Environmental Health	3	GEN&WS 533	Special Topics in Gender and Biology	3
ENVIR ST/ POP HLTH 502	Air Pollution and Human Health	3	GENETICS 466	Principles of Genetics	3
ENVIR ST/ F&W ECOL 515	Natural Resources Policy	3	GENETICS 467	General Genetics 1	3
ENVIR ST/ ATM OCN 520	Bioclimatology	3	GENETICS 468	General Genetics 2	3
FOOD SCI/ MICROBIO 324	Food Microbiology Laboratory	2	GENETICS 525	Epigenetics	3
FOOD SCI/ MICROBIO 325	Food Microbiology	3	GENETICS 545	Genetics Laboratory	2
FOOD SCI 410	Food Chemistry	3	GENETICS/ HORT 550	Molecular Approaches for Potential Crop Improvement	3
FOOD SCI 440	Principles of Food Engineering	3	GENETICS/ MD GENET 565	Human Genetics	3
FOOD SCI 511	Chemistry and Technology of Dairy Products	3	GENETICS 566	Advanced Genetics	3
FOOD SCI 514	Integrated Food Functionality	4	HORT 320	Environment of Horticultural Plants	3
FOOD SCI 550	Fermented Foods and Beverages	2	HORT/ AGRONOMY 501	Principles of Plant Breeding	3
FOOD SCI 611	Chemistry and Technology of Dairy Products	3	M M & I 301	Pathogenic Bacteriology	2
F&W ECOL 300	Forest Measurements	4	M M & I 341	Immunology	3
F&W ECOL 306	Terrestrial Vertebrates: Life History and Ecology	4	M M & I/ENTOM/ PATH-BIO/ ZOOLOGY 350	Parasitology	3
F&W ECOL 318	Principles of Wildlife Ecology	3	M M & I/PATH- BIO 528	Immunology	3
F&W ECOL/ ZOOLOGY 335	Human/Animal Relationships: Biological and Philosophical Issues	3	M M & I 554	Emerging Infectious Diseases and Bioterrorism	2
F&W ECOL/ ENVIR ST/ ZOOLOGY 360	Extinction of Species	3	MED PHYS/ H ONCOL 410	Radiobiology	2-3
F&W ECOL 379	Principles of Wildlife Management	3	MED PHYS/ B M E/H ONCOL/ PHYSICS 501	Radiation Physics and Dosimetry	3
F&W ECOL 401	Physiological Animal Ecology	3	MICROBIO 303	Biology of Microorganisms	3
F&W ECOL 404	Wildlife Damage Management	3	MICROBIO 304	Biology of Microorganisms Laboratory	2
F&W ECOL 410	Principles of Silviculture	3	MICROBIO 305	Critical Analyses in Microbiology	1
F&W ECOL 415	Tree Physiology	3	MICROBIO 330	Host-Parasite Interactions	3
F&W ECOL/ SURG SCI 548	Diseases of Wildlife	3	MICROBIO/AN SCI/ BOTANY 335	The Microbiome of Plants, Animals, and Humans	3
F&W ECOL 550	Forest Ecology	3	MICROBIO 345	Introduction to Disease Biology	3
F&W ECOL 561	Wildlife Management Techniques	3	MICROBIO 357	General Bioinformatics for Microbiologists	3
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology	2	MICROBIO/ SOIL SCI 425	Environmental Microbiology	3
F&W ECOL 590	Integrated Resource Management	3	MICROBIO 450	Diversity, Ecology and Evolution of Microorganisms	3
F&W ECOL/ AGRONOMY/ ENTOM/ M&ENVTOX 632	Ecotoxicology: The Chemical Players	1	MICROBIO 470	Microbial Genetics & Molecular Machines	3
F&W ECOL/ AGRONOMY/ ENTOM/ M&ENVTOX 633	Ecotoxicology: Impacts on Individuals	1	MICROBIO 520	Planetary Microbiology: What Life Here Tells Us About Life Out There	3
			MICROBIO/ SOIL SCI 523	Soil Microbiology and Biochemistry	3

MICROBIO 525	Field Studies of Planetary Microbiology and Life in the Universe	3
MICROBIO 526	Physiology of Microorganisms	3
MICROBIO 527	Advanced Laboratory Techniques in Microbiology	2
MICROBIO 551	Capstone Research Project in Microbiology	2
MICROBIO 607	Advanced Microbial Genetics	3
MICROBIO 626	Microbial and Cellular Metabolomics	3
MICROBIO 632	Industrial Microbiology/ Biotechnology	2
NEURODPT/ NTP 629	Molecular and Cellular Mechanisms of Memory	3
NTP/ NEURODPT 610	Cellular and Molecular Neuroscience	4
NTP/NEURODPT/ PSYCH 611	Systems Neuroscience	4
NUTR SCI 332	Human Nutritional Needs	3
NUTR SCI 431	Nutrition in the Life Span	3
ONCOLOGY 401	Introduction to Experimental Oncology	2
ONCOLOGY/ M&ENVTOX/ PHM SCI/PHMCOL-M/POP HLTH 625	Toxicology I	3
PHM SCI 310	Drugs and Their Actions	2
PHM SCI/B M E 430	Biological Interactions with Materials	3
PL PATH 300	Introduction to Plant Pathology	4
PL PATH/ SOIL SCI 323	Soil Biology	3
PL PATH 517	Plant Disease Resistance	2-3
PL PATH 558	Biology of Plant Pathogens	3
PL PATH 559	Diseases of Economic Plants	3
PL PATH 602	Ecology, Epidemiology and Control of Plant Diseases	3
PL PATH 622	Plant-Bacterial Interactions	2-3
PL PATH/M M & I/ ONCOLOGY 640	General Virology-Multiplication of Viruses	3
PSYCH 454	Behavioral Neuroscience	3
PSYCH 513	Hormones, Brain, and Behavior	4
PSYCH 612	Neuropharmacology	3
SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	3
SOIL SCI/ CIV ENGR 623	Microbiology of Waterborne Pathogens and Indicator Organisms	3
SOIL SCI/ CIV ENGR/ M&ENVTOX 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3
ZOOLOGY 300	Invertebrate Biology and Evolution	3
ZOOLOGY 301	Invertebrate Biology and Evolution Lab	2
ZOOLOGY 304	Marine Biology	2
ZOOLOGY/ ENVIR ST 315	Limnology-Conservation of Aquatic Resources	2

ZOOLOGY 316	Laboratory for Limnology- Conservation of Aquatic Resources	2-3
ZOOLOGY 425	Behavioral Ecology	3
ZOOLOGY 430	Comparative Anatomy of Vertebrates	5
ZOOLOGY 470	Introduction to Animal Development	3
ZOOLOGY 504	Modeling Animal Landscapes	3-5
ZOOLOGY/ ENVIR ST 510	Ecology of Fishes	3
ZOOLOGY/ ENVIR ST 511	Ecology of Fishes Lab	2
ZOOLOGY/ PSYCH 523	Neurobiology	3
ZOOLOGY/ GEOSCI 541	Paleobiology	3
ZOOLOGY/ GEOSCI 542	Invertebrate Paleontology	3
ZOOLOGY 555	Laboratory in Developmental Biology	3
ZOOLOGY 570	Cell Biology	3
ZOOLOGY 603	Endocrinology	3-4
ZOOLOGY 611	Comparative and Evolutionary Physiology	3
ZOOLOGY 612	Comparative Physiology Laboratory	2
ZOOLOGY/ ANTHRO/NTP/ PSYCH 619	Biology of Mind	3
ZOOLOGY 625	Development of the Nervous System	2

### Option B (Biocore)

Biocore is an honors-level, integrated sequence of lecture and lab courses that covers introductory and intermediate biology topics. Students must apply and be accepted to the program to take BIOCORE classes.

Code	Title	Credits
Complete these lecture courses:		
BIOCORE 381	Evolution, Ecology, and Genetics	3
BIOCORE 383	Cellular Biology	3
BIOCORE 485	Principles of Physiology	3
BIOCORE 587	Biological Interactions	3
Complete two of these lab classes:		
BIOCORE 382	Evolution, Ecology, and Genetics Laboratory	4
BIOCORE 384	Cellular Biology Laboratory	
BIOCORE 486	Principles of Physiology Laboratory	
<b>Total Credits</b>		<b>16</b>

### PHYSICS (CALCULUS-BASED)

#### Physics Requirements

Code	Title	Credits
Complete one of the following options: <sup>1</sup>		
PHYSICS 207 & PHYSICS 208	General Physics and General Physics (recommended)	10



PHYSICS 201 & PHYSICS 202	General Physics and General Physics	10
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<sup>1</sup> Students should consult with their advisor if they have credit for PHYSICS 103 and PHYSICS 104 to discuss options.

BIOCHE MISTRY

One set of introductory coursework and the capstone course are required, for a total of three BIOCHEM courses.

Introductory Courses

Code	Title	Credits
Complete one of the following options:		
BIOCHEM 507 & BIOCHEM 508	General Biochemistry I and General Biochemistry II (recommended)	6
OR		
BIOCHEM 501	Introduction to Biochemistry	3
AND one of the following advanced biochemistry electives:		
BIOCHEM/ NUTR SCI 510	Nutritional Biochemistry and Metabolism	
BIOCHEM/ NUTR SCI 560	Principles of Human Disease and Biotechnology	
BIOCHEM 570	Computational Modeling of Biological Systems	
BIOCHEM/ M M & I 575	Biology of Viruses	
BIOCHEM 601	Protein and Enzyme Structure and Function	
BIOCHEM/B M I/ BMOLCHEM/ MATH 609	Mathematical Methods for Systems Biology	
BIOCHEM/ GENETICS/ MICROBIO 612	Prokaryotic Molecular Biology	
BIOCHEM/ GENETICS/ MD GENET 620	Eukaryotic Molecular Biology	
BIOCHEM/ BOTANY 621	Plant Biochemistry	
BIOCHEM 625	Mechanisms of Action of Vitamins and Minerals	
BIOCHEM/ NUTR SCI 645	Molecular Control of Metabolism and Metabolic Disease	

Capstone Course (required)

Code	Title	Credits
BIOCHEM 551	Biochemical Methods	4

HONORS IN THE MAJOR

Students admitted to the university and to the College of Agricultural and Life Sciences are invited to apply to be considered for admission to the CALS Honors Program.

Admission Criteria for New First-Year Students:

- Complete program application including essay questions

Admission Criteria for Transfer and Continuing UW-Madison Students:

- UW-Madison cumulative GPA of at least 3.25
- Complete program application including essay questions

HOW TO APPLY

The application is available on the CALS Honors Program website (<https://cals.wisc.edu/academics/undergraduate/current-students/honors-program/>). Applications are accepted at any time.

New first-year students with accepted applications will automatically be enrolled in Honors in Research. It is possible to switch to Honors in the Major in the student’s first semester on campus after receiving approval from the advisor for that major. Transfer and continuing students may apply directly to Honors in Research or Honors in the Major (after approval from the major advisor).

REQUIREMENTS

All CALS Honors programs have the following requirements:

- Earn at least a cumulative 3.25 GPA at UW-Madison (some programs have higher requirements)
- Complete the program-specific requirements listed below
- Submit completed thesis documentation to CALS Academic Affairs

HONORS IN THE MAJOR IN BIOCHEMISTRY: REQUIREMENTS

To earn honors in the major in biochemistry, students must satisfy the requirements for the major (above) as well as the following requirements. All courses used for honors in the major requirements must receive "B" or better grades to fulfill requirements.

- Earn a 3.300 overall university GPA
- Earn a 3.300 GPA for all BIOCHEM courses, and all courses accepted in the major
- Complete BIOCHEM 507 and BIOCHEM 508 for Honors
- Complete a two-semester Senior Honors Thesis for 6 credits total, present research in a public forum and submit documentation to CALS Academic Affairs.
- Complete at least 14 credits of any combination of the following coursework:
  - Honors courses that would fulfill the biological science requirement in the major (see above)
  - Statistics coursework (does not need to be taken for honors): STAT 301, STAT 371, or STAT/B M I 541
  - Biochemistry elective coursework beyond the major requirements (does not need to be taken for Honors): NUTR SCI/BIOCHEM 510, BIOCHEM/ NUTR SCI 560, BIOCHEM 570, M M & I/BIOCHEM 575, BIOCHEM 601, MATH/B M I/BIOCHEM/BMOLCHEM 609, MICROBIO/BIOCHEM/GENETICS 612, MD GENET/BIOCHEM/ GENETICS 620, BOTANY/BIOCHEM 621, BIOCHEM 625, BIOCHEM/NUTR SCI 645
  - Honors coursework in MATH, CHEM, or PHYSICS from the list below:

## Math

Code	Title	Credits
MATH 341	Linear Algebra	3
MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	5
MATH 376	Topics in Multi-Variable Calculus and Differential Equations	5
MATH 521	Analysis I	3
MATH 522	Analysis II	3
MATH 541	Modern Algebra	3
MATH 542	Modern Algebra	3

Quality of Work

Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

## Chemistry

Code	Title	Credits
CHEM 109	Advanced General Chemistry	5
CHEM 115	Chemical Principles I	5
CHEM 116	Chemical Principles II	5
CHEM 343	Organic Chemistry I	3
CHEM 345	Organic Chemistry II	3
CHEM 344	Introductory Organic Chemistry Laboratory	2
CHEM 329	Fundamentals of Analytical Science	4
CHEM 547	Advanced Organic Chemistry	3
CHEM 561	Physical Chemistry	3
CHEM 565	Biophysical Chemistry	4
CHEM 563	Physical Chemistry Laboratory I	1
CHEM 562	Physical Chemistry	3
CHEM 564	Physical Chemistry Laboratory II	1

## Physics

Code	Title	Credits
PHYSICS 201	General Physics	5
PHYSICS 202	General Physics	5
PHYSICS 207	General Physics	5
PHYSICS 208	General Physics	5
PHYSICS 241	Introduction to Modern Physics	3
PHYSICS 247	A Modern Introduction to Physics	5
PHYSICS 248	A Modern Introduction to Physics	5
PHYSICS 249	A Modern Introduction to Physics	4

# UNIVERSITY DEGREE REQUIREMENTS

**Total Degree** To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

**Residency** Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.