BIOLOGY CORE CURRICULUM HONORS, CERTIFICATE

Biology Core Curriculum (Biocore (http://www.biocore.wisc.edu)) is an undergraduate Honors biology program for students who are motivated to learn biology within a small community of students, peer mentors, and faculty instructors. The four-semester curriculum of lecture and laboratory courses provides an integrated foundation of knowledge and skills applicable to any area of bioscience.

Unique aspects of Biocore include:

- Small classes and high faculty–instructor contact
- Emphasis on research, problem solving, science reasoning, group learning, and communication
- Collaborative community of students and faculty
- Peer mentoring, outreach, and directed study opportunities
- Earn Biocore Honors certificate[1]

[1] *Biology Core Curriculum Honors certificate* is available to students within the College of Agricultural and Life Sciences, the College of Engineering, the School of Human Ecology, the College of Letters & Science, and the School of Pharmacy. Students in the School of Business, the School of Education, and the School of Nursing are welcome to benefit from enrollment in the Biocore courses, but they are ineligible to earn the certificate. Students earn Honors course credit for each Biocore course and are eligible to earn a certificate upon completion of all four lecture courses and two of three lab courses with a grade of B or higher in all BIOCORE (http://guide.wisc.edu/courses/biocore) courses and 3.33 cumulative GPA.

Learning Goals:

Biocore is not a major but fulfills requirements (introductory to intermediate coursework, Honors, and Communication Part B) for a variety of biological science majors including those in the College of Agricultural and Life Sciences, College of Letters & Science, College of Engineering, and School of Pharmacy. See Biocore website and video (http://www.biocore.wisc.edu/about) to learn more.

By the end of the Biocore, students will

- **Reach for and achieve high standards:** 21st-century outcomes demand highly innovative, integrative, and excellence in all aspects of our work. As a Biocore community of students and instructors, we strive to challenge ourselves and meet these high standards of excellence, while providing support all along the way. Biocore students work hard to interact with concepts, ideas and the process of science to develop their own intellectual frameworks. Reaching for and achieving high standards for excellence in biology teaching and learning defines an honors mindset and the Biocore experience.
- **Actively engage in and practice group learning, collaboration and team work:** Learning and discovery is not a solitary task, but rather a social endeavor—with all students invested in a common goal, balanced with each student's individual and independent accountability. Research on learning has shown that working together in small groups is an effective way to learn and achieve together rather than in competition. Therefore, student achievement in Biocore courses is evaluated using a set scale rather than a curve. Through Biocore, students discover the power of group learning, appreciate the supportive learning community, and form friendships as they work in lab and lecture courses, in peer mentoring, in research and outreach experiences. In addition, small class size provides ample opportunity to get to know professors, develop mentor relationships, grow a professional network, and make this big university seem small.
- **Be able to apply science as a process:** The scientific process is a powerful method for discovery. Science has allowed us to understand an impressive amount, but its central tenet is that our models for how the world works are open to revision as new methods and information become available. Therefore, in Biocore, we focus on process —"how we know what we know," which includes understanding foundation concepts, using primary literature and data to support ideas and provide rationale for investigations, solving problems, applying critical thinking to challenging questions, and using integrative and analytical thinking to come to conclusions based on evidence. Students develop high-level scientific and interpersonal communication skills by writing and speaking about their own research.
- **Have a learning mindset:** Biocore focuses on the process of learning and the development of life long learners. Education is often measured in grades, awards and accolades; however, these do not always equate to the process or qualities of learning. Development of a learning mindset starts with active engagement with the material and the learning community including fellow students, instructors and peer mentors. Along the way, students develop their own process of learning that requires repetition, reflection and revision on how and what they are learning. Biocore's small class size allows students to receive high quality and timely feedback on learning and to develop biology specific knowledge, skills and competencies over four semesters.

HOW TO GET IN

Biocore is an application-based Honors program that starts in the fall. While any UW–Madison student can apply to Biocore, only students in the College of Agricultural and Life Sciences, the College of Engineering, the School of Human Ecology, the College of Letters & Science, and the School of Pharmacy will be eligible to have the certificate noted on their transcript.

Application options:

1. Regular: For all students who have have completed the prerequisites and would like to begin Biocore sophomore year. Applications are available through the Biocore website (http://www.biocore.wisc.edu/bioadmissions). Regular application deadline is in early March prior to April registration; however, Biocore continues to accept applications right up to the start of classes (space permitting).

2. Freshman: for a small cohort (~10) of well-prepared students who meet the requirements and would like to begin Biocore in the freshman year (see website (http://www.biocore.wisc.edu/bio_admissions_freshman)).

Most students apply during the spring of freshman year and begin fall of sophomore year. The regular deadline is mid-March; however, Biocore continues to accept applications up to the start of classes (space permitting). Contact the Biocore office for further information 608-265-2870.

PREREQUISITES

Please inquire about course equivalents.

Code	Title	Credits
Math		
Select one of the following:		
MATH 217	Calculus with Algebra and Trigonometry II	5
MATH 221	Calculus and Analytic Geometry 1	5
Introductory Chemistry		
Select one of the following:		5
CHEM 104	General Chemistry II	
CHEM 109	Advanced General Chemistry	
CHEM 115	Chemical Principles I	
Total Credits		15

[1] Organic chemistry (CHEM 341 or CHEM 343) is not a prerequisite for the BIOCORE program; however, organic chemistry is a prerequisite for BIOCORE 383 Cellular Biology.

REQUIREMENTS

Biology Core Curriculum Honors (Biocore) students must:
1. Complete all four BIOCORE lecture courses and two of three lab courses
2. Earn a 'B' grade or better in all BIOCORE courses
3. Complete degree with a cumulative GPA of 3.3 or higher

All BIOCORE courses are taken for honors credit.

Code	Title	Credits
Complete the following lecture courses (in sequence): [1]		
BIOCORE 381	Evolution, Ecology, and Genetics	3
BIOCORE 383	Cellular Biology	3
BIOCORE 485	Organismal Biology	3
BIOCORE 587	Biological Interactions	3
Complete two of the following lab courses (in any order):		4
BIOCORE 382	Evolution, Ecology, and Genetics Laboratory	
BIOCORE 384	Cellular Biology Laboratory	
BIOCORE 486	Organismal Biology Laboratory	
Total Credits		16

[1] Students pursuing the Biology Core Curriculum Certificate should not take the following courses since most majors will not allow credit for both:
ZOOLOGY/BIOLOGY/BOTANY 151
ZOOLOGY/BIOLOGY/BOTANY 152
ZOOLOGY/BIOLOGY 101
ZOOLOGY/BIOLOGY 102
BOTANY/BIOLOGY 130
GENETICS 466
PHYSIOL 335

LEARNING OUTCOMES

By the end of their Biocore Honors experience, students will:

1. Demonstrate a learning mindset and intellectual curiosity for biology
2. Demonstrate advanced level scientific reasoning and integration of biological concepts and processes – from molecules to the biosphere, across different forms of life, through space and time
3. Generate novel scientific questions, formulate hypotheses, carry out experiments, and make logical conclusions based on evidence
4. Demonstrate advanced scientific communication skills, oral and written, and the ability to translate their understanding to the broader community
5. Actively engage in and practice group learning, collaboration and teamwork
6. Reach for and achieve high standards in the quality of learning
7. Articulate the value of their Biocore Honors experience

FOUR-YEAR PLAN

EXAMPLE SEQUENCE OF BIOCORE COURSES AND RELATED COURSEWORK

Code	Title	Credits
Prerequisite Coursework		
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
CHEM 104	General Chemistry II	5
or CHEM 109	Advanced General Chemistry	
or CHEM 115	Chemical Principles I	
First Semester of Biocore Program		
BIOCORE 381	Evolution, Ecology, and Genetics (previous or concurrent registration in CHEM 341 or 343)	3
BIOCORE 382	Evolution, Ecology, and Genetics Laboratory	2
CHEM 343	Introductory Organic Chemistry	2-3
or CHEM 344	Introductory Organic Chemistry Laboratory	
or CHEM 345	Intermediate Organic Chemistry	
Second Semester of Biocore Program		
BIOCORE 383	Cellular Biology	3
BIOCORE 384	Cellular Biology Laboratory	2
CHEM 344	Introductory Organic Chemistry Laboratory	2-3
or CHEM 345	Intermediate Organic Chemistry	
PHYSICS 207	General Physics	5
Third Semester of Biocore Program		
BIOCORE 485	Organismal Biology	3
BIOCORE 486	Organismal Biology Laboratory	2
BIOCHEM 501	Introduction to Biochemistry	3
or BIOCHEM 507	General Biochemistry I	
PHYSICS 208	General Physics	5
Fourth Semester of Biocore Program		
BIOCORE 587	Biological Interactions	3

BIOCHEM 508	General Biochemistry II	3-4

To earn the certificate in Biology Core Curriculum Honors, students need only complete two of three BIOCORE laboratory courses.

ADVISING AND CAREERS

Some majors require students to complete the whole program but others do not. **Check with your major requirements and academic advisor.** Students who plan to study abroad during their junior year can plan to start Biocore as sophomores and complete coursework as seniors.

PEOPLE

Biocore faculty instructors come from departments and colleges across campus (College of Letters & Science, College of Agriculture and Life Sciences, School of Medicine and Public Health, College of Engineering) and bring with them different perspectives and disciplinary expertise on a whole range of topics and scales of biological organization from molecules to ecosystems. The curriculum permits students to attain a relatively high level of sophistication with complete flexibility of choice for subsequent major specialization.

Jeff Hardin (director), Janet Batzli (associate director), Michelle Harris (faculty associate), Seth McGee (lab manager), Carol Borcherding (program manager)

Biocore Committee: Hardin (director), Batzli (associate director), Harris, Howell, Moser, O'Connor

Affiliated Faculty

Elaine Alarid (Oncology, SMPH)

Bill Bement (Zoology, L&S)

Paul Bethke (Horticulture, CALS)

Erik Dent (Neuroscience, SMPH)

Irwin Goldman (Horticulture, CALS)

Anne Griep (Cell and Regenerative Biology, SMPH)

Jeff Hardin (Zoology, L&S)

Evelyn Howell (Landscape Architecture, CALS)

Stephen Johnson (Comparative Biosciences, VetMed)

Trina McMahon (Civil and Environmental Engineering, Engr)

Amy Moser (Oncology, SMPH)

Shelby O'Connor (Pathology, SMPH)

WISCONSIN EXPERIENCE

The Biocore Experience is aligned with the Wisconsin Experience, supporting students' development of knowledge, intellectual skills and social responsibilities.

Biocore is an Honors biology program, a *community* and a *curriculum*, that challenges students to discover and reach their academic potential within a supportive biology education program. The Biocore honors community of highly motivated students work with dedicated faculty to extend opportunities for scientific research, communication, integrative learning and collaboration in the context of a four-semester undergraduate biology curriculum.

Students say:

"Biocore has helped me **think about science in a completely different way**."

"I have never been so challenged, nor so **excited about learning** as during my time in Biocore."

"Biocore taught me how to **think critically and how to question**. I learned to be part of a team and made some great friendships. "

"Taking Biocore made other **advanced courses in biology/ biochemistry/ genetics so much easier** because I gained such solid background knowledge."

"Biocore has been my most valuable academic experience yet. It has helped me develop my **scientific writing skills, ability to problem solve as a member of a team, and to think like a scientist**."

"The **great staff and teaching teams** are excellent ---they **really care** and invest a huge amount of time to benefit our learning."

See Biocore Experience video (http://www.biocore.wisc.edu/about) and alumni profiles (http://www.biocore.wisc.edu/alumni).

The Biocore curriculum provides an Honors experience in introductory to intermediate level integrated biology. Students experience small class sizes and a high instructor/student ratio all within a learning community of highly motivated and dedicated Honors students, faculty, staff and peers. Biocore courses emphasize problem-solving, critical thinking, research, scientific writing, group learning, and the process of science. In this collaborative and supportive learning community, students are also able to engage in peer mentoring (http://www.biocore.wisc.edu/peer_mentors), in directed study opportunities in the Biocore Prairie (http://www.biocore.wisc.edu/prairie), and in K-12 outreach through the Biocore Outreach Ambassadors (http://www.biocore.wisc.edu/outreach).