From:	Smith, Randy
To:	Andrews, Adam; Fisk, Harold
Cc:	Leite, Fabio; Reed, Katie; Smith, Randy; King, Tara S.; Duffy, Lisa; Orr, James; Vankeerbergen, Bernadette; Martin, Andrew; Olesik, Susan V.; Horn, David
Subject:	Proposal to create an Integrated General Biology Specialization
Date:	Wednesday, November 15, 2023 4:23:42 PM
Attachments:	image001.png

Adam and Harold:

The proposal from the Center for Life Sciences Education to create an Integrated General Biology Specialization for the Biology major programs (BA and BS) was approved by the Council on Academic Affairs at its meeting on November 15, 2023. Thank you for attending the meeting to respond to questions/comments.

No additional level of internal approval is necessary. This action will be included in the Council's next Annual Activities Report to the University Senate (July 2024).

The Office of the University Registrar will work you with any implementation issues.

Please keep a copy of this message for your file on the proposal and I will do the same for the file in the Office of Academic Affairs.

If you have any questions please contact the Chair of the Council, Professor Fábio Leite(.11), or me.

I wish you success with this important program development.

Randy

THE OHIO STATE UNIVERSITY

W. Randy Smith, Ph.D.
Vice Provost for Academic Programs
Office of Academic Affairs
University Square South, 15 E. 15th Avenue, Columbus, OH 43201
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From:	Vankeerbergen, Bernadette
To:	Smith, Randy; Reed, Katie
Cc:	Martin, Andrew; Jenkins, Mary Ellen; Ottesen, Jennifer; Steele, Rachel
Subject:	Revision to the Biology Major
Date:	Thursday, October 12, 2023 9:05:36 PM
Attachments:	image001.png Proposal to Create an Integrated General Biology Specialization Complete.pdf Biology Major Revision Letter of Motion.pdf

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Dear Randy and Katie,

Please find attached a proposal to revise the Biology major, more specifically to create a fourth specialization in the major: the Integrated General Biology Specialization. The proposal was approved on Friday, October 6, 2023 by the ASC Curriculum Committee (ASCC).

We are now advancing the proposal for review by CAA. The attached documents are: (1) the actual proposal and (2) the Natural and Mathematical Sciences Subcommittee cover letter to ASCC .

Please use this email as a cover letter indicating that the proposal has been duly reviewed and approved by the appropriate ASC curricular bodies (including the full ASC Curriculum Committee).

Please let me know if you have any questions.

Best regards,
Bernadette

THE OHIO STATE UNIVERSITY

Bernadette Vankeerbergen, Ph.D.
Assistant Dean, Curriculum
College of Arts and Sciences
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Columbus, OH 43210
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THE OHIO STATE UNIVERSITY

Ian M Hamilton
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Department of Mathematics

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Chair, Arts and Sciences Curriculum Committee

October 3, 2023

Dear Chair and Members of the Arts and Sciences Curriculum Committee:

On September 14, 2023, the Natural and Mathematical Sciences Subcommittee reviewed a request from the Center for Life Sciences Education to add an Integrated General Biology Specialization to the BA and BS Biology major programs, to be implemented for the Autumn 2024 semester.

The proposed specialization in Integrated General Biology would be the fourth specialization in the Biology major programs, alongside the existing specializations in Pre-Health Professions, Life Sciences Education, and Forensic Biology. As the three existing specializations are tailored toward particular career paths, the specialization in Integrated General Biology is designed to provide a broad education in Biology and offer a pathway for students who do not intend to pursue careers in these areas.

The proposed specialization includes one core course that is shared by all specializations, and six required majors courses that reflect a broad range of subdisciplines within Biology and which align to the goals and expected learning outcomes of the Biology majors.

The NMS Subcommittee voted unanimously to approve the request with no recommendations, and the proposal is now advanced to the ASCC with a motion to approve.

Sincerely,

Ian Hamilton
Professor
Department of Evolution, Ecology, and Organismal Biology
Department of Mathematics
Chair, ASCC Natural and Mathematical Sciences Subcommittee

THE OHIO STATE UNIVERSITY

College of Arts and Sciences

Center for Life Sciences Education

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23 August 2023

To Whom It May Concern:

The Center for Life Sciences Education respectfully submits the attached proposal for an additional fourth Specialization to the Biology Major Program, the *Integrated General Biology Specialization*. The current three specializations are all titled to reflect very focused career paths: *Pre-Health Professions, Life Sciences Education,* and *Forensic Biology*. Both direct and indirect student feedback has been clear that we need a more generalized pathway for students who are not intending to pursue careers in these three areas. In some cases students want to pursue a General Biology degree to prepare them for career paths not covered by the existing specializations, while some students seek to switch to a General Biology program after deciding not to pursue professional studies. For these latter students, the lack of a General Biology option is often cited as a reason for leaving the Biology major entirely.

Despite the names of the existing specializations, one of the hallmarks of the Biology Major is its overall flexibility. The *Integrated General Biology Specialization* being proposed does not fundamentally change the course choices afforded to students in the Major but provides a more prescribed pathway for students who seek a broad understanding of our diverse discipline. This specialization would suit students looking to pursue graduate school, industry, or agency positions after graduation. An important priority for the new specialization is to help students find a home in the life sciences should they decide to switch out of one of the other specializations, improving retention in the major.

We look forward to the Committees' review and welcome any questions or concerns.

Sincerely,

Harold Fisk, PhD
Interim Director, Center for Life Sciences Education

Proposal to Create an *Integrated General Biology Specialization* for the Biology Major Program

Center for Life Sciences Education | College of Arts & Sciences

Table of Contents

Rationale

The Bachelor of Science and Bachelor of Arts Biology Major Programs use a *Specialization* structure in which students must choose one of three current transcripted specializations to follow. Each specialization is aligned to the Biology Program Outcomes but makes use of the very flexible options allowed by the Major to create an individually-tailored pathway to guide students toward their desired career goals. The current specializations include *Pre-Health Professions* (PHP), *Life Sciences Education* (LSE), and *Forensic Biology* (FB). Approximately 80% of Biology Majors choose the PHP specialization, often with the goal of progressing to a health-related professional school (i.e., Medical, Dental, Optometry, Veterinary, etc.). In practice we know that only a small subset of students will earn the competitive admission to one of the professional schools, and students often tell our academic advisors upon deciding to change career plans that they do no longer want to complete the PHP Specialization or have a 'pre-health' designation. Such students feel constrained and frequently do not know what to do with the PHP specialization if they aren't intending to go to a professional school. Without a clear path to other non-health fields students often leave the Major entirely. At OSU, only slightly more than half of students who matriculate as Biology Majors are retained in STEM majors two years later. For minoritized students, that number is closer to 40%. The lack of clear or desirable alternative options to the PHP Specialization is often cited by students as a reason for leaving the major.

In order to provide a more general pathway for students interested broadly in the life sciences, we propose the creation of a fourth Biology Major Specialization (BS & BA) called the *Integrated General Biology Specialization (IGB)* to be implemented for the **Autumn 2024 semester**. The pathway will be flexible enough both for students who wish to direct enroll as well as those wishing to pivot away from one of the other more directed specializations. The breadth of content in this specialization will provide a pathway for students to apply to graduate school, as well as find research, agency, or industry positions. As proposed, the IGB specialization continues to offer the elective flexibility that is a hallmark of the other specializations while still providing a structure that ensures the program outcomes are met.

Each of the three current specializations share the same GE, Supporting Course, and Core Course structure (page 1 of the Advising Sheet, shown as Figures 1 and 3 below), though the supporting course requirements are differentiated by the BS and BA plans respectively. The proposed Integrated General Biology Specialization would have these same requirements as their respective existing BS and BA counterparts. Page two of the advising sheets (Figures 2 and 4 below) contains the specialization-specific requirements, which would be identical for both the BS and BA plans. Those advising sheets follow on the next pages and a four year course plan is laid out in *Appendix A*. For comparison, the advising sheets for the existing three specializations can be found in *Appendices B-G*.

Figure 1: IGB BS Specialization Advising Sheet, Page 1

Biology Major Checklist
Bachelor of Science
Integrated General Biology Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

❒ GE Launch Seminar (1)	GENED 1201
❒ Foundations: Writing and Information Literacy (3)	_____
❒ Foundations: Mathematics & Quantitative Reasoning (3-5)	_____
❒ Foundations: Literacy, Visual & performing Arts (3)	_____
❒ Foundations: Historical & Cultural Studies (3)	_____
❒ Foundations: Natural Sciences (4-5)	_____
❒ Foundations: Social & Behavioral Sciences (3)	_____
❒ Foundations: Race, Ethnic and Gender Diversity (3)	_____
❒ Theme: Citizenship for a Diverse & Just World (4-6)	_____
❒ Theme: Student Choice (4-6)	_____
❒ GE Reflection (1)	GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

❒ Arts & Sciences Survey (1)	_____
❒ World Language (0-12)	_____

Required Supporting Courses (48-54 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics (2 courses)
- ❒ Math 1151 or 1156 (5)**
- ❒ Math 1152 (5) or Stat 2480 (3) or Stat 2450 (3)
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation; MQRM requirement

Physics (2 Courses)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ Physics 1201 (alg) or 1251 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry (2 lectures + 2 labs)
- ❒ Chemistry 2510 or 2610 or 2910H (4) – Lecture 1
- ❒ Chemistry 2520 or 2620 or 2920H (4) – Lecture 2
- ❒ Chemistry 2540 or 2940H (2) – Lab 1
- ❒ Chemistry 2550 or 2950H (2) – Lab 2
- ❒ _____Substitution

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

† Courses within the major with a laboratory component

Figure 2: IGB BS Specialization Advising Sheet, Page 2

Biology Major Checklist
Bachelor of Science
Integrated General Biology Specialization

Integrated Biology Specialization (28-36 credit hours)

Required

- ❒ MolGen 4500 (3) or 4606 (4)
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100† (5)
- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ EEOB 3510 or MolGen 4700 or MolGen 5607 or MolGen 5608 (3) – *Cell Biology*
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ EEOB 3410† (4) - *Ecology*

Two Advanced (4000+) electives (6-10)

- ❒ _____( )
- ❒ _____( )

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

- ❒ Advanced Writing — Biology 3401
- ❒ Advanced Data Analytics — Biology 3401
- ❒ Technology Literacy — Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- The two advanced electives must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics. Courses outside these departments must be pre-approved by a Biology advisor.
- Other electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Figure 3: IGB BA Specialization Advising Sheet, Page 1

Biology Major Checklist
Bachelor of Arts
Integrated General Biology Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

❒ GE Launch Seminar (1)	GENED 1201
❒ Foundations: Writing and Information Literacy (3)	_____
❒ Foundations: Mathematics & Quantitative Reasoning (3-5)	_____
❒ Foundations: Literacy, Visual & performing Arts (3)	_____
❒ Foundations: Historical & Cultural Studies (3)	_____
❒ Foundations: Natural Sciences (4-5)	_____
❒ Foundations: Social & Behavioral Sciences (3)	_____
❒ Foundations: Race, Ethnicity and Gender Diversity (3)	_____
❒ Theme: Citizenship for a Diverse & Just World (4-6)	_____
❒ Theme: Student Choice (4-6)	_____
❒ GE Reflection (1)	GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

❒ Arts & Sciences Survey (1)	_____
❒ World Language (0-12)	_____

Required Supporting Courses (32-42 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics
- ❒ Math 1148 (4)** – *College Algebra* AND Math 1149 (3) – *Trigonometry*, OR Math 1150 (5) **– *Pre-Calculus*
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation: MQRM requirement

Physics (1 Course)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry
Chemistry 2310 (4),
OR 2510 AND 2520 (8)
OR 2510 AND 2540 (6)
- ❒ _____Substitution
- ❒ Waived

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

Figure 4: IGB BA Specialization Advising Sheet, Page 2

Biology Major Checklist
Bachelor of Arts
Integrated Biology Specialization

Integrated Biology Specialization (28-36 credit hours)

Required

- ❒ MolGen 4500 (3) or 4606 (4)
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100† (5)
- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ EEOB 3510 or MolGen 4700 or MolGen 5607 or MolGen 5608 (3) – *Cell Biology*
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ EEOB 3410† (4) - *Ecology*

Two Advanced (4000+) electives (6-10)

- ❒ _____( )
- ❒ _____( )

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

- ❒ Advanced Writing — Biology 3401
- ❒ Advanced Data Analytics — Biology 3401
- ❒ Technology Literacy — Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- The two advanced electives must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics. Courses outside these departments must be pre-approved by a Biology advisor.
- Other electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Biology Program Goals and Outcomes

BA outcomes

Goal 1: Explain major biological concepts and discuss how these are connected with various areas of the biological and physical sciences.

1.1. Describe the hierarchical relationship between structure and function at all levels: molecular, cellular, and organismic.

1.2. Diagram, explain, and contrast the major cellular processes in Archaea, bacteria, and eukaryotes.

1.3. Differentiate types of biological macromolecules and compare their contributions to cellular structure and function.

1.4. Apply the principles of genetics and describe the flow of genetic information.

1.5. Explain changes in organisms through time by applying the principles of evolutionary biology.

1.6. Demonstrate how relationships among living things are understood through taxonomy and phylogenetic analysis.

1.7. Describe ecological relationships between organisms and their environment.

Goal 2: Demonstrate problem solving, analytical, and communication skills that will provide the foundation for lifelong learning and career development.

2.1. Apply the scientific process, including designing and conducting experiments and testing hypotheses.

2.2. Use laboratory equipment, employ safe laboratory practices, and adapt tools such as laboratory notebooks and spreadsheets to organize and analyze data associated with scientific processes.

2.3. Retrieve information from the life sciences literature; read, understand, and critically review scientific papers.

2.4. Prepare oral and written reports following a recognized scientific format.

2.5. Develop an awareness of the careers and professions that rely on knowledge of biological sciences.

Goal 3: Value biology as an integral part of society and everyday life.

3.1. Demonstrate at least one of the following skills with regard to biology and society: communication, argumentation, social responsibility, ethics, and/or cultural competency.

BS outcomes

Goal 1: Explain major biological concepts and discuss how these are connected with various areas of the biological and physical sciences.

1.1. Describe the hierarchical relationship between structure and function at all levels: molecular, cellular, and organismic.

1.2. Diagram, explain, and contrast the major cellular processes in Archaea, bacteria, and eukaryotes.

1.3. Differentiate types of biological macromolecules and compare their contributions to cellular structure and function.

1.4. Apply the principles of genetics and describe the flow of genetic information.

1.5. Explain changes in organisms through time by applying the principles of evolutionary biology.

1.6. Demonstrate how relationships among living things are understood through taxonomy and phylogenetic analysis.

1.7. Describe ecological relationships between organisms and their environment.

Goal 2: Apply concepts from mathematics and other science disciplines for the analysis of processes in living organisms.

2.1. Apply quantitative skills in the analysis of biological processes.

2.2. Apply concepts from chemistry in the analysis of biological processes.

2.3. Apply concepts from physics in the analysis of biological processes.

Goal 3: Demonstrate problem solving, analytical, and communication skills that will provide the foundation for lifelong learning and career development.

3.1. Apply the scientific process, including designing and conducting experiments and testing hypotheses.

3.2. Use laboratory equipment, employ safe laboratory practices, and adapt tools such as laboratory notebooks and spreadsheets to organize and analyze data associated with scientific processes.

3.3. Retrieve information from the life sciences literature; read, understand, and critically review scientific papers.

3.4. Prepare oral and written reports following a recognized scientific format.

3.5. Develop an awareness of the careers and professions that rely on knowledge of biological sciences.

Goal 4: Value biology as an integral part of society and everyday life.

Our selections for the six required major courses reflect alignment to these outcomes, ensuring students following this specialization will minimally receive intermediate level instruction in each of the outcomes as shown in the curriculum map below (see *Appendix H* for BS and *Appendix I* for BA). The three laboratory course requirement will ensure sufficient instruction in the skills areas. The two upper-level elective choices give students the freedom of course choice that is a hallmark of the Biology Major broadly. The overlap of the required courses in IGB when compared with the other specializations allows us to move forward without need to adjust the curriculum map, nor will it significantly impact our assessment planning or course operations. Both regional campuses offering the Biology Major currently, Lima and Marion, not only have the course offerings to meet the IGB requirements but have expressed great enthusiasm at the prospect of having a second specialization they can offer students. Both currently have course offerings sufficient only to offer the PHP specialization.

The breadth of the life sciences at Ohio State gives our students unique opportunities compared to other institutions. For many programs, a general Biology pathway may be all that is available due to limited course selection, or if there are options they would typically fall into a General Biology and sub-discipline specific majors such as Molecular Genetics or Biochemistry. Our students benefit from having six sub-disciplinary majors to choose from in addition to the Biology Major, and while Biology has three specializations, there is no “general biology’ pathway for students to choose, unlike most other colleges and universities. The breadth of content

required of this specialization compared to our existing pathways will provide students with better exposure to the diversity of the life sciences and in doing so will give students a greater opportunity to explore and, hopefully, find the right future path for them while retaining students in the Major. It is worth noting that this proposed specialization is not groundbreaking in structure. Students could already choose most of these same courses required of IGB as electives in the existing specializations. The value of the IGB Specialization is that it provides a clear pathway for students who do not wish to be designated pre-health, education, or forensic biology-bound in their careers but want a better-rounded course plan in the life sciences.

We anticipate that the majority of Biology Major Students will continue to opt for the Pre-Health Professions Specialization, so the overall number of students enrolled in the IGB is likely to be a small proportion of Biology Majors. However, we do anticipate that the addition of this specialization will help retain students in the Biology major. Given that our current retention numbers suggest a student roster that is in substantial flux the effect of the IBG specialization on retention is not anticipated to have a significant impact on our advising services.

Appendix A: Sample 4-year course plans for BS and BA

BS – BIOLOGY		Integrated General Biology Specialization			
SEMESTER	**COURSE**	**CREDIT HOURS**	**CH Sem Total**	**CH per Year**	**Credit Hour Summary**
Autumn I	ASC 1100	1	15	32	**Gen Ed Hours = 38***
	Math 1151 (GE: MQR)	5			**ASC Hours = 13**
	Chem 1210	5			**Supporting Course Hours = 48***
	Foreign Lang 1	4			**Major Hours = 32**
Spring I	GenEd 1201	1	17		**Total Hours = 122**
	Bio 1113 (GE: Nat Sci)	4			
	Stat 2480	3			
	Chem 1220	5			
	Foreign Lang 2	4			
Autumn II	Bio 1114	4	17	33	
	Chem 2510	4			
	Chem 2540	2			
	Foreign Lang 3	4			***9 CH overlap between Supporting Courses and GE***
	GE Found: WIL	3			
Spring II	Bio 3401	4	16		
	Chem 2520	4			
	Chem 2550	2			
	EEOB 3310	3			
	GE Found: LVPA	3			
Autumn III	Biochem 4511	4	15	30	
	CJDW Theme	3			
	Physics 1200	5			
	GE Found: HCS	3			
Spring III	MolGen 4606	4	15		
	Physics 1201	5			
	CJDW Theme	3			
	GE Found: REGD	3			
Autumn IV	GenEd 4001	1	14	27	
	Micro 4000	4			
	EEOB 3510	3			
	Choice Theme	3			
	Choice Theme	3			
Spring IV	Bio 4798 (Adv Elect)	3	13		
	EEOB 4510 (Adv Elect)	3			
	GE Found: SBS	3			
	EEOB 3410	4			

**Note: This sample schedule assumes Mathematics placement of Math 1151 (or AP/EM credit) and does not account for any AP/EM credit for GE requirements.*

BA – BIOLOGY			Integrated General Biology Specialization		
SEMESTER	**COURSE**	**CREDIT HOURS**	**CH Sem Total**	**CH per Year**	**Credit Hour Summary**
Autumn I	ASC 1100	1	15	32	**Gen Ed Hours = 38***
	Math 1150 (GE: MQR)	5			
	Chem 1210	5			**ASC Hours = 13**
	Foreign Lang 1	4			
Spring I	GenEd 1201	1	17		**Supporting Course Hours = 34***
	Bio 1113 (GE: Nat Sci)	4			
	GE Found: WIL	3			**Major Hours = 32**
	Chem 1220	5			
	Foreign Lang 2	4			**Open Electives Hours = 13**
Autumn II	Bio 1114	4	17	33	**Total Hours = 121**
	Chem 2510	4			
	Chem 2540	2			***9 CH overlap between Supporting Courses and GE***
	Foreign Lang 3	4			
	GE Found: LVPA	3			
Spring II	Bio 3401	4	16		
	GE Found: SBS	3			
	GE Found: HCS	3			
	EEOB 3310	3			
	Choice Theme	3			
Autumn III	Biochem 4511	4	16	29	
	CJDW Theme	3			
	Physics 1200	5			
	EEOB 3410	4			
Spring III	MolGen 4606	4	13		
	EEOB 3510	3			
	CJDW Theme	3			
	GE Found: REGD	3			
Autumn IV	GenEd 4001	1	14	27	
	Micro 4000	4			
	Choice Theme	3			
	Open Elective	3			
	Open Elective	3			
Spring IV	Bio 4798 (Adv Elect)	3	13		
	EEOB 4510 (Adv Elect)	3			
	Open Elective	4			
	Open Elective	3			

**Note: This sample schedule assumes Mathematics placement of Math 1151 (or AP/EM credit) and does not account for any AP/EM credit for GE requirements.*

Appendix B: Pre-Health Professions BS Specialization Advising Sheet

Biology Major Checklist
Bachelor of Science
Pre-Health Professions Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

- ❒ GE Launch Seminar (1) — GENED 1201
- ❒ Foundations: Writing and Information Literacy (3) — _____
- ❒ Foundations: Mathematics & Quantitative Reasoning (3-5) — _____
- ❒ Foundations: Literacy, Visual & performing Arts (3) — _____
- ❒ Foundations: Historical & Cultural Studies (3) — _____
- ❒ Foundations: Natural Sciences (4-5) — _____
- ❒ Foundations: Social & Behavioral Sciences (3) — _____
- ❒ Foundations: Race, Ethnic and Gender Diversity (3) — _____
- ❒ Theme: Citizenship for a Diverse & Just World (4-6) — _____
- ❒ Theme: Student Choice (4-6) — _____
- ❒ GE Reflection (1) — GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

- ❒ Arts & Sciences Survey (1) — _____
- ❒ World Language (0-12) — _____

Required Supporting Courses (48-54 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics (2 courses)
- ❒ Math 1151 or 1156 (5)**
- ❒ Math 1152 (5) or Stat 2480 (3) or Stat 2450 (3)
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation; MQRM requirement

Physics (2 Courses)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ Physics 1201 (alg) or 1251 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry (2 lectures + 2 labs)
- ❒ Chemistry 2510 or 2610 or 2910H (4) – Lecture 1
- ❒ Chemistry 2520 or 2620 or 2920H (4) – Lecture 2
- ❒ Chemistry 2540 or 2940H (2) – Lab 1
- ❒ Chemistry 2550 or 2950H (2) – Lab 2
- ❒ _____Substitution

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

† Courses within the major with a laboratory component

Biology Major Checklist
Bachelor of Science
Pre-Health Professions Specialization

Pre-Health Professions Specialization (15-25 credit hours)

Required

- ❒ MolGen 4500 (3) or 4606 (4)

Additional Coursework (at least 4)

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ EEOB 3510 or MolGen 4700 or MolGen 5607 or MolGen 5608 (3) – *Cell Biology*
- ❒ EEOB 3520† (3) – *Microscopic Anatomy / Histology*
- ❒ Anatomy 2300.01† (4) or 3300.01† (5) or EEOB 2510† (3) – *Human Anatomy*
- ❒ EEOB 4510† (3) – *Comparative Vertebrate Anatomy*
- ❒ Physio 3200 (5) or EEOB 2520 (3) – *Human Physiology* or EEOB 4520 (3) *Comparative Physiology*
- ❒ EEOB 3270 (3) or 3320 (3) or 3410 (4) or 3420 (4) or 4240 (3) – *Ecology*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

❒ Advanced Writing	Biology 3401
❒ Advanced Data Analytics	Biology 3401
❒ Technology Literacy	Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix C: Pre-Health Professions BA Specialization Advising Sheet

Biology Major Checklist
Bachelor of Arts
Pre-Health Professions Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

- ❒ GE Launch Seminar (1) — GENED 1201
- ❒ Foundations: Writing and Information Literacy (3) — _____
- ❒ Foundations: Mathematics & Quantitative Reasoning (3-5) — _____
- ❒ Foundations: Literacy, Visual & performing Arts (3) — _____
- ❒ Foundations: Historical & Cultural Studies (3) — _____
- ❒ Foundations: Natural Sciences (4-5) — _____
- ❒ Foundations: Social & Behavioral Sciences (3) — _____
- ❒ Foundations: Race, Ethnicity and Gender Diversity (3) — _____
- ❒ Theme: Citizenship for a Diverse & Just World (4-6) — _____
- ❒ Theme: Student Choice (4-6) — _____
- ❒ World Language (0-12) — _____
- ❒ GE Reflection (1) — GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

- ❒ Arts & Sciences Survey (1) — _____
- ❒ World Language (0-12) — _____

Required Supporting Courses (32-42 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics
- ❒ Math 1148 (4)** – *College Algebra* AND Math 1149 (3) – *Trigonometry*, OR Math 1150 (5) **– *Pre-Calculus*
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation: MQRM requirement

Physics (1 Course)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry
Chemistry 2310 (4),
OR 2510 AND 2520 (8)
OR 2510 AND 2540 (6)
- ❒ _____Substitution
- ❒ Waived

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

Biology Major Checklist
Bachelor of Arts
Pre-Health Professions Specialization

Pre-Health Professions Specialization (15-25 credit hours)

Required

- ❒ MolGen 4500 (3) or 4606 (4)

Additional Coursework (at least 4)

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ EEOB 3510 or MolGen 4700 or MolGen 5607 or MolGen 5608 (3) – *Cell Biology*
- ❒ EEOB 3520† (3) – *Microscopic Anatomy / Histology*
- ❒ Anatomy 2300.01† (4) or 3300.01† (5) or EEOB 2510† (3) – *Human Anatomy*
- ❒ EEOB 4510† (3) – *Comparative Vertebrate Anatomy*
- ❒ Physio 3200 (5) or EEOB 2520 (3) – *Human Physiology* or EEOB 4520 (3) *Comparative Physiology*
- ❒ EEOB 3270 (3) or 3320 (3) or 3410 (4) or 3420 (4) or 4240 (3) – *Ecology*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

❒ Advanced Writing	Biology 3401
❒ Advanced Data Analytics	Biology 3401
❒ Technology Literacy	Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix D: Life Sciences Education BS Specialization Advising Sheet

Biology Major Checklist
Bachelor of Science
Life Science Education Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

- ❒ GE Launch Seminar (1) — GENED 1201
- ❒ Foundations: Writing and Information Literacy (3) — _____
- ❒ Foundations: Mathematics & Quantitative Reasoning (3-5) — _____
- ❒ Foundations: Literacy, Visual & performing Arts (3) — _____
- ❒ Foundations: Historical & Cultural Studies (3) — _____
- ❒ Foundations: Natural Sciences (4-5) — _____
- ❒ Foundations: Social & Behavioral Sciences (3) — _____
- ❒ Foundations: Race, Ethnic and Gender Diversity (3) — _____
- ❒ Theme: Citizenship for a Diverse & Just World (4-6) — _____
- ❒ Theme: Student Choice (4-6) — _____
- ❒ GE Reflection (1) — GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

- ❒ Arts & Sciences Survey (1) — _____
- ❒ World Language (0-12) — _____

Required Supporting Courses (48-54 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics (2 courses)
- ❒ Math 1151 or 1156 (5)**
- ❒ Math 1152 (5) or Stat 2480 (3) or Stat 2450 (3)
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation; MQRM requirement

Physics (2 Courses)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ Physics 1201 (alg) or 1251 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry (2 lectures + 2 labs)
- ❒ Chemistry 2510 or 2610 or 2910H (4) – Lecture 1
- ❒ Chemistry 2520 or 2620 or 2920H (4) – Lecture 2
- ❒ Chemistry 2540 or 2940H (2) – Lab 1
- ❒ Chemistry 2550 or 2950H (2) – Lab 2
- ❒ _____Substitution

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

Biology Major Checklist
Bachelor of Science
Life Science Education Specialization

Life Science Education Specialization (21-28 credit hours)

Required (5 courses)

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ MolGen 4500 (3) or 4606 (4)
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ MolGen 3300† (3) – *General Plant Biology*

Additional Coursework (at least 2)

- ❒ EEOB 2220† (2) – *Biodiversity of Ohio: Birds*
- ❒ EEOB 2510† (3) – *Human Anatomy*
- ❒ EEOB 2520 (3) – *Human Physiology*
- ❒ EEOB 3320 (strongly recommended) † (3) – *Organismal Diversity*
- ❒ EEOB 4210 (2) – *Ecology and Evolution: Vertebrates*
- ❒ EEOB 4220† (3) – *Ecology and Evolution: Mammals*
- ❒ EEOB 4230 (2) – *Ecology and Evolution: Invertebrates*
- ❒ EEOB 5430† (3) – *Fish Ecology*
  OR EEOB 5930† (3) – *Ichthyology*
- ❒ Entomology 4000 (3) – *General Entomology Lecture*
- ❒ MolGen 4591S or equiv. (1) – *DNA Fingerprinting Workshop with Columbus Public Schools*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

- ❒ Advanced Writing — Biology 3401
- ❒ Advanced Data Analytics — Biology 3401
- ❒ Technology Literacy — Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix E: Life Sciences Education BA Specialization Advising Sheet

Biology Major Checklist
Bachelor of Arts
Life Science Education Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

- ❒ GE Launch Seminar (1) — GENED 1201
- ❒ Foundations: Writing and Information Literacy (3) — _____
- ❒ Foundations: Mathematics & Quantitative Reasoning (3-5) — _____
- ❒ Foundations: Literacy, Visual & performing Arts (3) — _____
- ❒ Foundations: Historical & Cultural Studies (3) — _____
- ❒ Foundations: Natural Sciences (4-5) — _____
- ❒ Foundations: Social & Behavioral Sciences (3) — _____
- ❒ Foundations: Race, Ethnicity and Gender Diversity (3) — _____
- ❒ Theme: Citizenship for a Diverse & Just World (4-6) — _____
- ❒ Theme: Student Choice (4-6) — _____
- ❒ GE Reflection (1) — GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

- ❒ Arts & Sciences Survey (1) — _____
- ❒ World Language (0-12) — _____

Required Supporting Courses (32-42 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics
- ❒ Math 1148 (4)** – *College Algebra* AND Math 1149 (3) – *Trigonometry*, OR Math 1150 (5)** – *Pre-Calculus*
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation: MQRM requirement

Physics (1 Course)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry
- ❒ Chemistry 2310 (4) OR 2510 AND 2520 (8) OR 2510 AND 2540 (6)
- ❒ _____Substitution
- ❒ Waived

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

Biology Major Checklist
Bachelor of Arts
Life Sciences Education Specialization

Life Sciences Education Specialization (21-28 credit hours)

Required (5 courses)

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ MolGen 4500 (3) or 4606 (4)
- ❒ EEOB 3310 or 3310.01 or 3310.02† (4) – *Evolution*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ MolGen 3300† (3) – *General Plant Biology*

Additional Coursework (at least 2)

- ❒ EEOB 2220† (2) – *Biodiversity of Ohio: Birds*
- ❒ EEOB 2510† (3) – *Human Anatomy*
- ❒ EEOB 2520 (3) – *Human Physiology*
- ❒ EEOB 3320 (strongly recommended) † (3) – *Organismal Diversity*
- ❒ EEOB 4210 (2) – *Ecology and Evolution: Vertebrates*
- ❒ EEOB 4220† (3) – *Ecology and Evolution: Mammals*
- ❒ EEOB 4230 (2) – *Ecology and Evolution: Invertebrates*
- ❒ EEOB 5430† (3) – *Fish Ecology*
  OR EEOB 5930† (3) – *Ichthyology*
- ❒ Entomology 4000 (3) – *General Entomology Lecture*
- ❒ MolGen 4591S or equiv. (1) – *DNA Fingerprinting Workshop with Columbus Public Schools*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

- ❒ Advanced Writing — Biology 3401
- ❒ Advanced Data Analytics — Biology 3401
- ❒ Technology Literacy — Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix F: Forensic Biology BS Specialization Advising Sheet

Biology Major Checklist
Bachelor of Science
Forensics Biology Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

❒ GE Launch Seminar (1)	GENED 1201
❒ Foundations: Writing and Information Literacy (3)	_____
❒ Foundations: Mathematics & Quantitative Reasoning (3-5)	_____
❒ Foundations: Literacy, Visual & performing Arts (3)	_____
❒ Foundations: Historical & Cultural Studies (3)	_____
❒ Foundations: Natural Sciences (4-5)	_____
❒ Foundations: Social & Behavioral Sciences (3)	_____
❒ Foundations: Race, Ethnic and Gender Diversity (3)	_____
❒ Theme: Citizenship for a Diverse & Just World (4-6)	_____
❒ Theme: Student Choice (4-6)	_____
❒ GE Reflection (1)	GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

❒ Arts & Sciences Survey (1)	_____
❒ World Language (0-12)	_____

Required Supporting Courses (48-58 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics (2 courses)
- ❒ Math 1151 or 1156 (5)**
- ❒ Math 1152 (5) or Stat 2480 (3) or Stat 2450 (3)
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation; MQRM requirement

Physics (2 Courses)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ Physics 1201 (alg) or 1251 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) and 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry (2 lectures + 2 labs)
- ❒ Chemistry 2510 or 2610 or 2910H (4) – Lecture 1
- ❒ Chemistry 2520 or 2620 or 2920H (4) – Lecture 2
- ❒ Chemistry 2540 or 2940H (2) – Lab 1
- ❒ Chemistry 2550 or 2950H (2) – Lab 2
- ❒ _____Substitution

Anthropology (1 course)
- ❒ Anthro 2200 (4) (*optional, necessary for Anthro prereqs)*

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

† Courses within the major with a laboratory component

Biology Major Checklist
Bachelor of Science
Forensics Biology Specialization

Forensic Biology (14-22 credit hours)

Required

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ MolGen 4500 (3) or 4606 (4)

Additional Coursework (at least 3)***

- ❒ Anthro 5607 (3) – *Human Osteology*
- ❒ Anthro 5608 (3) – *Skeletal Biology*
- ❒ Anthro 5609 (3) – *Dental Anthropology*
- ❒ Anthro 5610 (3) – *Bioarchaeology*
- ❒ Anthro 5644 (3) – *Forensic Anthropology*
- ❒ BioChem 5615 (3) – *Biochemistry and Molecular Biology III*
- ❒ MolGen 5601† (3-4) – *Eukaryotic Molecular Genetics Lab*
- ❒ MolGen 5607 (3) – *Cell Biology*
- ❒ MolGen 5701 (3) – *DNA Transactions and Gene Regulation*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ MolGen 4591S or equiv. (1) – *DNA Fingerprinting Workshop in Columbus Public Schools*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

❒ Advanced Writing	Biology 3401
❒ Advanced Data Analytics	Biology 3401
❒ Technology Literacy	Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor. At most 7 credit hours from Anthropology may be counted toward the Biology major.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix G: Forensic Biology BA Specialization Advising Sheet

Biology Major Checklist
Bachelor of Arts
Forensic Biology Specialization

NAME_____ DATE_____
SEMESTER OF GRADUATION _____

General Education Requirements (32-39 credit hours)

- ❒ GE Launch Seminar (1) — GENED 1201
- ❒ Foundations: Writing and Information Literacy (3) — _____
- ❒ Foundations: Mathematics & Quantitative Reasoning (3-5) — _____
- ❒ Foundations: Literacy, Visual & performing Arts (3) — _____
- ❒ Foundations: Historical & Cultural Studies (3) — _____
- ❒ Foundations: Natural Sciences (4-5) — _____
- ❒ Foundations: Social & Behavioral Sciences (3) — _____
- ❒ Foundations: Race, Ethnicity and Gender Diversity (3) — _____
- ❒ Theme: Citizenship for a Diverse & Just World (4-6) — _____
- ❒ Theme: Student Choice (4-6) — _____
- ❒ GE Reflection (1) — GENED 4001

Required Arts & Sciences Courses (1-13 Credit Hours)

- ❒ Arts & Sciences Survey (1) — _____
- ❒ World Language (0-12) — _____

Required Supporting Courses (32-46 credit hours)

Biology (2 courses)
- ❒ Biology 1113.01 (4) or 1113.02 (5)*
- ❒ Biology 1114.01 (4) or 1114.02 (5)*
- ❒ _____Substitution

* Can be used to fulfill the GEN Foundation: Natural Sciences requirement

Mathematics/Statistics
- ❒ Math 1148 (4)** – *College Algebra* AND Math 1149 (3) – *Trigonometry*, OR Math 1150 (5)** – *Pre-Calculus*
- ❒ _____Substitution

** Can be used to fulfill the GEN Foundation: MQRM requirement

Physics (1 Course)
- ❒ Physics 1200 (alg) or 1250 (calc) (5)
- ❒ _____Substitution

Chemistry (2 courses)
- ❒ Chemistry 1206 (3) AND 1208 (4) or 1210 or 1610 or 1910H (5)
- ❒ Chemistry 1220 or 1620 or 1920H (5)
- ❒ _____Substitution

Organic Chemistry
- ❒ Chemistry 2310 (4) OR 2510 AND 2520 (8) OR 2510 AND 2540 (6)
- ❒ _____Substitution
- ❒ Waived

Anthropology (1 course)
- ❒ Anthro 2200 (4) (*optional, necessary for Anthro prereqs)*

Core Course (4 credit hours)

- ❒ Biology 3401 (4) – *Integrated Biology*

Biology Major Checklist
Bachelor of Arts
Forensic Biology Specialization

Forensic Biology Specialization (14-22 credit hours)

Required

- ❒ Biochem 4511 (4), or 5613 AND 5614 (6)
- ❒ MolGen 4500 (3) or 4606 (4)

Additional Coursework (at least 3)***

- ❒ Anthro 5607 (3) – *Human Osteology*
- ❒ Anthro 5608 (3) – *Skeletal Biology*
- ❒ Anthro 5609 (3) – *Dental Anthropology*
- ❒ Anthro 5610 (3) – *Bioarchaeology*
- ❒ Anthro 5644 (3) – *Forensic Anthropology*
- ❒ BioChem 5615 (3) – *Biochemistry and Molecular Biology III*
- ❒ MolGen 5601† (3-4) – *Eukaryotic Molecular Genetics Lab*
- ❒ MolGen 5607 (3) – *Cell Biology*
- ❒ MolGen 5701 (3) – *DNA Transactions and Gene Regulation*
- ❒ Micro 4000† or 4000.01† or 4000.02† (4) or 4100 (5)
- ❒ MolGen 4591S or equiv. (1) – *DNA Fingerprinting Workshop in Columbus Public Schools*

Electives

_____ _____

_____ _____

Embedded Literacies (no additional credit hours)

- ❒ Advanced Writing Biology 3401
- ❒ Advanced Data Analytics Biology 3401
- ❒ Technology Literacy Biology 3401

TOTAL BioSci HOURS		TOTAL SEMESTER UNITS	

Notes:

- Core, specialization, and elective courses must total 32 semester units, and must include three laboratory courses.
- At least 25 of the 32 semester units must be courses in Biochemistry, Biology, EEOB, Microbiology, or Molecular Genetics, and courses outside these departments must be pre-approved by a Biology advisor. At most 7 credit hours from Anthropology may be counted toward the Biology major.
- Electives must be at the 2000 level or above, except for Biology which must be at the 3000 level or above.
- Up to 3 credit hours of research, individual study, or internship may be counted toward the major and, with approval of a major advisor, may be counted as a laboratory course.
- Transfer credit allowed - no more than one half of the credit hours required on the major.
- Honors versions of courses substitute freely.

† Courses within the major with a laboratory component

Appendix H: Biology B.S. Major Requirements

Program Learning Goals*

	Course	cr hr	Course Title	Comments	1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written report	2.5 Life sci careers	3.1 Integrate
Required Prereq Courses (offered by the	Biol 1113	4	Biological Sciences: Energy Transfer and Development	Prerequisite; some additional content	B	B	B	B	B			B	B	B	B	B	B
	Biol 1114	4	Biological Sciences: Form, Function, Diversity, and Ecology	Prerequisite; some additional content		B			B	B	B	B	B	B	B	B	I
Required Prerequisite Courses (offered outside the unit)	Chem 1210	5	General Chemistry		B		B					B	B		B		
	Chem 1220	5	General Chemistry		B		B					B	B		B		
	Chem 2510	4	Organic Chemistry		B		B										
	Chem 2520	4	Organic Chemistry		B		I										
	Chem 2540	2	Organic Chemistry Laboratory		B		B					B	B		B		
	Chem 2550	2	Organic Chemistry Laboratory		B		B					B	B		B		
	Math 1156	5	Calculus for the Biological Sciences					B		B						B	B
	Stat 2480	5	Statistics for the Biological Sciences	**New Math/Stat requirement**				B	B	B	B	B	B	B		B	B
	Physics 1200	5	Introductory Physics		B		B					B	B		B		
	Physics 1201	5	Introductory Physics		B		B					B	B		B		

Appendix H: Biology B.S. Major Requirements

	Course	cr hr	Course Title	Comments	Program Learning Goals* 1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written report	2.5 Life sci careers	3.1 Integrate
Required Core Course (offered by	Biol 3401	4	Integrated Biology	Core course; because of additional coverage in prerequisites, 2 Q courses combined into one S	I	I	I	I	I	I	I	I	B	I	I	I	A
Integrated General Biology Specialization																	
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Micro 4000	4	Basic and Practical Microbiology		A	I	I	I	I	I	I	A	A	I	A	I	I
	Biochem 4511	4	General Biochemistry		A	I	A		I					I		I	I
	EEOB 3510	3	Cell Biology		A	A	I	I	I			I					I
	EEOB 3310	4	Evolution		A	I		I	A	I	I			I		I	I
	EEOB 3410	4	Ecology		I	I			I		A	A	I	I	I	I	I
	Additional coursework, including lab requirement	6			A	A	A	A	A	A	A	A	A	A	A	A	A
Education in Life Sciences Specialization																	
	Biochem 4511	4	General Biochemistry		A	I	A		I					I		I	I
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I

d outside the unit)

Appendix H: Biology B.S. Major Requirements

Program Learning Goals*

Courses comprising specializations (offere	Course	cr hr	Course Title	Comments	1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written report	2.5 Life sci careers	3.1 Integrate
	EEOB 3310	4	Evolution		A	I		I	A	I	I			I		I	I
	Micro 4000	4	Basic and Practical Microbiology		A	I	I	I	I	I	I	A	A	I	A	I	I
	MolGen 3300	4	General Plant Biology		A	I	I	I	I	I	I	A	A	I	A	I	I
	Additional coursework, including lab requirement	9			A	A	A	A	A	A	A	A	A	A	A	A	A
	Forensic Biology Specialization																
	Anthro 2200	4	Physical	Additional prerequisite				B	B	B	B	B	B		B	B	B
	Biochem 4511	4	General Biochemistry		I	I	A		I					I		I	I
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Additional coursework, including lab requirement	17			A	A	A	A	A	A	A	A	A	A	A	A	A
	Pre-Health Professions Specialization																
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Additional coursework, including lab requirement	25			A	A	A	A	A	A	A	A	A	A	A	A	A

Appendix H: Biology B.S. Major Requirements

Course	cr hr	Course Title	Comments	Program Learning Goals*												
				1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written report	2.5 Life sci careers	3.1 Integrate

B = beginning, I = intermediate, A = advanced

* Full text of program learning goals:

1.1 Describe the hierarchical relationship between structure and function at all levels: molecular, cellular, and organismic.

1.2 Diagram, explain, and contrast the major cellular processes in Archaea, bacteria, and eukaryotes.

1.3 Differentiate types of biological macromolecules and compare their contributions to cellular structure and function.

1.4 Apply the principles of genetics and describe the flow of genetic information.

1.5 Explain changes in organisms through time by applying the principles of evolutionary biology.

1.6 Demonstrate how relationships among living things are understood through taxonomy and phylogenetic analysis.

1.7 Describe ecological relationships between organisms and their environment.

2.1 Apply the scientific process, including designing and conducting experiments and testing hypotheses.

Use laboratory equipment, employ safe laboratory practices, and adapt tools such as laboratory notebooks and spreadsheets to organize and analyze

2.2 data associated with scientific processes.

2.3 Retrieve information from the life sciences literature; read, understand, and critically review scientific papers.

2.4 Prepare oral and written reports following a recognized scientific format.

2.5 Develop an awareness of the careers and professions that rely on knowledge of biological sciences.

3.1 Integrate biological knowledge in discussions of society and everyday life

Appendix I: Biology B.A. Major Requirements

	Course	cr hr	Course Title	Comments	Program Learning Goals* 1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written reports	2.5 Life sci careers	3.1 Integrate
Required Prereq Courses (offered by the unit)	Biol 1113	4	Biological Sciences: Energy Transfer and Development	Prerequisite; some additional content	B	B	B	B	B			B	B	B	B	B	B
	Biol 1114	4	Biological Sciences: Form, Function, Diversity, and Ecology	Prerequisite; some additional content		B			B	B	B	B	B	B	B	B	I
Required Prerequisite Courses (offered outside the unit)	Chem 1210	5	General Chemistry		B		B					B	B		B		
	Chem 1220	5	General Chemistry		B		B					B	B		B		
	Chem 2310	4	Organic Chemistry		B		I									B	
	Math 1149 or 1150	5	Pre-Calculus										B			B	B
	Physics 1200	5	Introductory Physics		B		B					B	B		B		
Required Core Course (offered by the unit)	Biol 3401	4	Integrated Biology	Core course; because of additional coverage in prerequisites, 2 Q courses combined into one S	I	I	I	I	I	I	I	I	B	I	I	I	A
	Integrated General Biology Specialization																
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Micro 4000	4	Basic and Practical Microbiology		A	I	I	I	I	I	I	A	A	I	A	I	I

Appendix I: Biology B.A. Major Requirements

Program Learning Goals*

	Course	cr hr	Course Title	Comments	1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written reports	2.5 Life sci careers	3.1 Integrate
prising specializations (offered outside the unit)	Biochem 4511	4	General Biochemistry		A	I	A		I					I		I	I
	EEOB 3510	3	Cell Biology		A	A	I	I	I			I					I
	EEOB 3310	4	Evolution		A	I		I	A	I	I			I		I	I
	EEOB 3410	4	Ecology		I	I			I		A	A	I	I	I	I	I
	Additional coursework, including lab requirement	6			A	A	A	A	A	A	A	A	A	A	A	A	A
	Life Sciences Education Specialization																
	Biochem 4511	4	General Biochemistry		A	I	A		I					I		I	I
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	EEOB 3000	4	Evolution		A	I		I	A	I	I			I		I	I
	Micro 4000	4	Basic and Practical Microbiology		A	I	I	I	I	I	I	A	A	I	A	I	I
	MolGen 3300	4	General Plant Biology		A	I	I	I	I	I	I	A	A	I	A	I	I
	Additional coursework, including lab requirement	9			A	A	A	A	A	A	A	A	A	A	A	A	A
	Forensic Biology Specialization																

Appendix I: Biology B.A. Major Requirements

	Course	cr hr	Course Title	Comments	Program Learning Goals* 1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written reports	2.5 Life sci careers	3.1 Integrate
Courses com	Anthro 2200	4	Physical	Additional prerequisite				B	B	B	B	B	B		B	B	B
	Biochem 4511	4	General Biochemistry		I	I	A		I					I		I	I
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Additional coursework, including lab requirement	17			A	A	A	A	A	A	A	A	A	A	A	A	A
	Pre-Health Professions Specialization																
	MolGen 4500	3	General Genetics		A	I	A	A	I	I				I		I	I
	Additional coursework, including lab requirement	25			A	A	A	A	A	A	A	A	A	A	A	A	A

B = beginning, I = intermediate, A = advanced

*** Full text of program learning goals:**

1.1 Describe the hierarchical relationship between structure and function at all levels: molecular, cellular, and organismic.

1.2 Diagram, explain, and contrast the major cellular processes in Archaea, bacteria, and eukaryotes.

Appendix I: Biology B.A. Major Requirements

Course	cr hr	Course Title	Comments	Program Learning Goals* 1.1 Structure and function	1.2 Cellular processes	1.3 Biomolecules	1.4 Genetics	1.5 Evolution	1.6 Taxonomy	1.7 Ecology	2.1 Scientific process	2.2 Lab skills	2.3 Life sciences literature	2.4 Oral and written reports	2.5 Life sci careers	3.1 Integrate

1.3 Differentiate types of biological macromolecules and compare their contributions to cellular structure and function.

1.4 Apply the principles of genetics and describe the flow of genetic information.

1.5 Explain changes in organisms through time by applying the principles of evolutionary biology.

1.6 Demonstrate how relationships among living things are understood through taxonomy and phylogenetic analysis.

1.7 Describe ecological relationships between organisms and their environment.

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2.2 Use laboratory equipment, employ safe laboratory practices, and adapt tools such as laboratory notebooks and spreadsheets to organize and analyze data associated with scientific processes.

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