Honors Proposal Program Worksheet

Honors Program Name/Dept Biological Sciences Discipline/College/Interdisciplinary Center CESCOS

Program summary and justification	Acceptable	Notes
Entry requirements		See page 1-2
1) formal honors program application		Attached
2) identifies entry GPA Cumulative/Major specific		Min cum GPA ≥ 3.2
3) additional entry requirements		BSC 1010/1011+Ls, CHM 2045/6+Ls
4) limited to 20% of students with this major		Limited to 20% of students with this major
Standards		See page 2
1) maintain GPA requirement Cumulative/College specific		Maintain GPA req & obtain "S" in Research Cr
2) other appropriate standards: program completion within a specified time frame, statement regarding academic irregularity, other codes of conduct, attendance/participation at specific events, other requirements		Students must adhere to FAU Regulations 4.007, 4.001 and the ethical standards of the discipline.
3) delineates probation and dismissal procedure		Students must maintain 1) and 2) above; See page 2
Honors level enrichment		See page 2
1) adheres to one of these themes: Interdisciplinary connections, research, leadership, service learning, creativity/innovation, civic engagement, collaboration, environment (Southeast FL), other		Research theme
2) three (3) three-credit courses or equivalent recommended		Two variable credit courses (DIR, 0-3 credits)
Capstone Requirement (#1 **OR** #2 must be met and identified)		Grant application submission and poster/seminar presentation
1) thesis requirement: honors level appropriate, consideration of length and depth, reviewed by 2 or more faculty, discussed or "defended," relevant to honors theme		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2) alternative experience: graduate level coursework, solo exhibition or recital, performance, extended internship, project, other		Research experience (see pages 2,3,6)

Recommendation for approval ☐ YES ☐ NO

Recommendations for program change:

Reviewer_____ Date_____

Department of Biological Sciences
Charles E. Schmidt College of Science

Upper Division Honors Program Change Proposal

The mission of the Biology Honors Program is to provide an enriched learning experience for high-performing students. The Department of Biological Sciences proposes to establish a second path to honors within our existing Honors in the Major program. The program currently requires the completion of an Honors Thesis over the course of a series of writing intensive courses. The differences between the existing honors pathway and the newly proposed, additional pathway are described in the below sections of this document and also provided in table format for ease of comparison between the two options (see Table 1, page 6). Students who fulfill all program requirements associated with one of the biology honors pathways and have a final cumulative GPA of 3.2 or greater at the time of degree conferral will receive a designation of Honors in the Major on their transcript. To differentiate between the two honors pathways, we are requesting that the respective transcript notations be assigned:

- "**Honors in Biological Sciences – Research Thesis**" (for participants in the extant option) and
- "**Honors in Biological Sciences – Research**" (for future participants in the proposed alternative option).

The two options will be referred to as the "Thesis" and "Research" options respectively in this document.

Establishment of this additional path to honors will increase opportunities for biology majors to develop high-level proficiencies in skills required for graduate school and careers in science through direct participation in cutting edge research experiences and enhanced relationships with faculty mentors. Students will develop skills in critical thinking, the identification of research questions, experimental design, collection and reporting of data, techniques in biological research, and the ethical standards of the field. Participants will exit the program prepared for continuation of their education in a graduate program and/or for the highly competitive STEM job market.

Entry Requirements

Students are eligible to apply if they meet the following criteria:

1) Students must complete the Biology Honors Program Application Form (see attached).
    a. The application must be approved by the departmental Honors Committee.
2) Have an overall GPA $\geq$ 3.2
3) Have successfully completed:
    a. Biodiversity + Lab (BSC 1011 + BSC 1011L)
    b. Bioprinciples + Lab (BSC 1010 + BSC 1010L)
    c. General Chemistry I + Lab (CHM 2045 + CHM 2045L)
    d. General Chemistry II + Lab (CHM 2046 + CHM 2046L)

4) It is recommended but not required that students have also completed the following courses prior to applying:
    a. Organic Chemistry I (CHM 2210)
    b. Methods of Calculus (or higher) (MAC 2233)
    c. One course in Statistics from:
        i. Introduction to Biostatistics (STA 3173)
        ii. Experimental Design and Statistical Inference (PSY 3234)

    *At no time will the Honors Program (to include the combined populations within both pathways) exceed 20% of the total undergraduate biology major student enrollment.

Program Standards

1) Participants must maintain high academic and ethical standards.
2) Students may be dismissed from the program for any of the following:
    a. Failure to maintain and overall GPA $\geq$ 3.2
    b. Failure to obtain a grade of "Satisfactory" in Directed Independent Research completed under confirmed faculty mentor
    c. Violation of the Code of Academic Integrity
    d. Violation of the Student Code of Conduct
3) In the event of withdrawal or dismissal from the program, successfully completed program-specific Directed Independent Research credits will be applied to the traditional bachelor's degree in Biology with no penalty.
4) Students participating in the Honors program are expected to become informed of and adhere to the Student Code of Conduct (FAU Regulation 4.007), the Code of Academic Integrity (FAU Regulation 4.001) as well as the ethical standards of the discipline.

Students who fulfill all program requirements and have a final cumulative GPA of 3.2 or greater at the time of degree conferral will receive a designation of Honors in the Major on their transcript. Those students who meet all other criteria but do not have a final cumulative GPA of 3.2 or greater at the time of degree conferral will not receive this designation on their transcript.

Note: Prior to initiating research, students must obtain appropriate safety training through Environmental Health & Safety. The necessary trainings will be specific to the research to be conducted and will be determined between each student and their program faculty mentor. Students who will work on projects supported by NIH and or NSF funding must also complete Responsible Conduct of Research (Basic) Training through CITI Program.

Honors Level Enrichment

1) Honors level enrichment will be provided in the form of extensive mentoring in practical research by departmental faculty or approved departmental affiliated faculty (see Capstone Experience) culminating in production of a grant application and research poster or presentation (see Capstone Experience).

Capstone Experience

1) The capstone experience will consist of:
    a. At least 2 semesters of Directed Independent Research in Biology (BSC 4916) with a confirmed faculty mentor which may be taken for 0-3 credits in a given semester.
        i. ***As per existing policy, students may apply a maximum of 5 of these credits toward completion of biology bachelor's degree program elective requirements.**
    b. Production and submission of an internal or external grant application no later than the spring semester of the junior year.
    c. Dissemination of research results via seminar or poster presentation at a local, regional, national or international conference.

Outcomes

Students who fulfill all program requirements and have a final cumulative GPA of 3.2 or greater at the time of degree conferral will receive a designation of Honors in the Major on their transcript. To differentiate between the two paths to honors, we are requesting that the transcript designations be assigned "Honors in Biological Sciences – Research Thesis" (for participants in the extant pathway) and "Honors in Biological Sciences – Research" (for future participants in the proposed, new pathway).

Proposed Program Description for web:

Honors in Biological Sciences – Research

The Department of Biological Sciences offers an Honors Research Program that recognizes research accomplishments of talented undergraduates. Honors Research students actively participate in all steps involved in research – from the planning and execution of an experiment, to the analysis and dissemination of the results. This program is by application and students must have completed a minimum of 20 credits from within the biology major core and have an overall GPA of 3.2 to be eligible for consideration. The complete list of currently available biology courses can be found here:
http://www.fau.edu/academic/registrar/FAUcatalog/scienceDES.php#biology.

Students usually begin the program in their sophomore or junior year and conduct independent supervised research during their junior and senior years. Honors Research applications are due no later than the end of the add/drop period of the fall semester of the junior year. When special circumstances apply, the departmental Honors Committee may accept an application beyond the normal due date.

Participants in the program must secure a faculty mentor prior to applying to the program and commit to completing a minimum of two semesters of Biology Directed Independent Research (BSC 4916) with that faculty mentor. Interested students should contact the faculty member

whose research interests are closest to those the student wishes to pursue. Students may contact the Honors Program Coordinator for support in identifying potential faculty mentors. The primary areas of research include: conservation biology, marine biology, morphology and biomechanics, animal behavior, neuroscience, environmental science and molecular, cellular and developmental biology; however, we encourage integration among the specializations. Additionally, students may collaborate on their research projects with Max Planck Florida Institute, The Scripps Research Institute, Harbor Branch Oceanographic Institute, or nearby state and federal laboratories. See http://biology.fau.edu/home/faculty.php for more information about specific faculty research interests.

Submission of a grant application to the Office of Undergraduate Research and Inquiry or a recognized external entity (e.g. National Science Foundation, National Institutes of Health) is required during the spring semester of the junior year at the latest. A poster presentation or seminar describing the results of their research at a local (e.g. FAU Undergraduate Research Symposium), regional or national conference is required before the end of the senior year.

Note: Student participants in the Honors Research Program must obtain appropriate laboratory safety training prior to initiating research. All students must obtain three key trainings: Laboratory Safety Training, Biological Safety Training, and Hazardous Waste Awareness and Handling. Students may also require additional trainings that are specific to the research project (e.g. scientific diving training). Students must confer with their confirmed mentor to identify appropriate trainings and register for training through Environmental Health and Safety (EH&S) at http://www.fau.edu/facilities/ehs/training/index.php. Students participating in research labs within the affiliated institutions mentioned above must obtain site-specific EH&S training through the institution in which they are conducting their research. Students who will work on projects supported by NIH and or NSF funding must also complete Responsible Conduct of Research (Basic) Training through CITI Program.

Note: Participants have the option to enroll in zero credit DIR (BSC 4916) in order to avoid incurring excess credit hours. *It is each student's responsibility to work with their academic advisor to minimize additional costs associated with the completion of excess credits.*

> **Florida Statute 1009.286** defines "excess hours" as credit hours that exceed the completion requirements for a baccalaureate degree program at state universities. For students enrolling in a state university or a Florida State College System institution for the first time in or after the fall 2009 semester, a tuition rate surcharge will be applied for excess hours. The surcharge is assessed only on the tuition portion of the semester hour cost, not on the fees. The amount of the surcharge and the allowable "excess hours" are determined by the initial term of entry as indicated in the catalog.

Code of Academic Integrity Policy Statement:
"Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on

personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation" at https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf

Students participating in the Honors Research program are expected to become informed of and adhere to the ethical standards of the discipline.

Table 1
A Side by Side Comparison of the Existing and Newly Proposed Alternative Enrichment/Capstone Options for the Honors in the Major in Biological Sciences Program

Honors in the Major	
Honors in Biological Sciences – Research Thesis (existing capstone option)	**Honors in Biological Sciences – Research** (newly proposed alternative capstone option)
Eligibility Requirements: • Confirmed faculty mentor/sponsor • GPA ≥ 3.2 • Completion of ≥ 20 credits core biology program requirements to include: o BSC 1011+L o BSC 1010+L o CHM 2045+L o CHM 2046+L	**Eligibility Requirements:** • Confirmed faculty mentor/sponsor • GPA ≥ 3.2 • Completion of ≥ 20 credits core biology program requirements to include: o BSC 1011+L o BSC 1010+L o CHM 2045+L o CHM 2046+L
Course Requirements: • Intro to Biological Research (1 cr) • Biological Research (2 cr) • Honors Research (3 cr) • Honors Thesis (3 cr)	**Course Requirements:** • A minimum of 2 semesters (1 year commitment) enrolled in Directed Independent Research (0-3 credits) with confirmed faculty mentor
Deliverables: • Poster presentation • Written thesis proposal manuscript and oral defense • Written final thesis manuscript and final seminar presentation/defense of experimental results	**Deliverables:** • Submission of an internal (e.g. OURI) or external grant application • Presentation of a seminar or poster at a local (e.g. OURI's Undergraduate Research Symposium), regional, national or international conference/symposium
Outcomes: • Transcript notation: Honors in Biological Sciences – Research Thesis	**Outcomes:** • Transcript notation: Honors in Biological Sciences – Research

*__Note__: completed courses listed under "Course Requirements" within the above table may be applied toward the fulfillment of the biology BS/BA major elective requirements.

*__Note__: the newly proposed capstone option permits students to enroll in a zero credit DIR in order to prevent students from being deterred from participating due to concerns regarding accumulation of excess credits.

Appendix A
Directed Independent Research Assessment Rubric

Student Learning Objective 1: Knowledge

Students will demonstrate content knowledge of basic biology principles as demonstrated by the successful production of a grant proposal. Demonstration of higher level competency is expected with seniors and junior level students at the discretion of faculty. It is expected that participants are able to effectively communicate their proposed research and experimental results in context and using technical language specific to the subfield in which they are conducting their research. Students will also receive extensive training in laboratory safety (general and specific to their research programs) through Environmental Health and Safety which will culminate in the awarding of certificates of completion.

Student Learning Objective 1 Scoring Criteria (above and beyond successful completion and renewal as needed of the above training courses):
Exemplary - Students identify all concepts that are applicable to the selected field of study.
Competent - Students identify most relevant concepts that are applicable to the selected field of study.
Developing - Students reports concepts that are incomplete, with limited vocabulary or not applicable to the discipline.

Student Learning Objective 2: Formulate Questions

Students shall formulate or identify research questions and evaluate the literature to integrate basic principles and knowledge of biology and how they apply.

Student Learning Objective 2 Scoring Criteria:
Exemplary - Students identify a key critical question applicable to the selected field of study.
Competent - Students identify a mostly relevant question that is applicable to the selected field of study.
Developing - Students report a question that is incomplete or not applicable to the selected field of study.

Student Learning Objective 3: Plan of Action

Students will develop and implement an experimental approach to address research and inquiry questions or scholarly problems. Students' plan of action will be evaluated both in the written grant proposal and in the conference poster or seminar.

Student Learning Objective 3 Scoring Criteria:
Exemplary - Students recognize and explain experiments efficiently.
Competent - Students recognize but do not explain experiments consistently.
Developing - Students recognize and explain experiments in limited styles.

Student Learning Objective 4: Critical Thinking

Students will apply critical thinking skills to evaluate information, their own work, and the work of others. Specifically, critical review of biology methods applied will be assessed both during oral presentations and in evaluating written reports.

Student Learning Objective 4 Scoring Criteria:
Exemplary - Students report data and make most relevant conclusions out of experimental results.
Competent - Students report data and make some conclusions out of experimental results with a few errors.
Developing - Students fail to report data, make only few conclusions out of experimental results, and work is inaccurate.

Student Learning Objective 5: Ethical Conduct

Students will identify and follow significant ethics while conducting research and inquiry. Students will obtain training in Responsible Conduct of Research online through Citi Program culminating in the awarding of one or more certificates of completion of general training in research ethics (topics include authorship and collaborative research, conflicts of interest, human subjects, research misconduct) and specialized trainings as appropriate (e.g. ethical care and treatment of research animals for students working with vertebrates).

Student Learning Objective 5 Scoring Criteria (above and beyond successful completion and renewal as needed of the above training courses):
Exemplary - Students record and use good laboratory practices and cite all relevant sources in reports.
Competent - Students record and mostly use good laboratory practices and cite all relevant sources in reports.
Developing - Students fail to report all sources or inconsistently exhibit good laboratory behavior.

Student Learning Objective 6: Communication

Students will convey their research and inquiry in both oral and written formats.

Student Learning Objective 6 Scoring Criteria:
Exemplary - Students' grant proposals, research posters and or seminars are complete and present all relevant information.
Competent - Students' grant proposals, research posters and or seminars are mostly complete and present most relevant information.
Developing - Students' grant proposals, research posters and or seminars are incomplete.

Appendix B
Biology Honors Research Program Capstone Experience

Objective: Provide upper-division biology students an opportunity to apply knowledge obtained across prior biology courses and research experiences.

Honors program integration: The capstone experience will be applied by the production of a grant proposal and either a research poster or seminar presented at a conference resulting from at least 2 semesters of BSC 4916. The capstone experience will be completed by students over the course of the junior and senior year.

Research: Faculty advisors will select and direct the research experience.

Capstone requirements: Students must register for a minimum of two semesters of Directed Independent Research in Biology (BSC 4916). Signed (by the faculty mentor) copies of the required grant proposal with documented evidence of submission and a pdf version of the presented poster or seminar slides with documented evidence of conference/symposium participation (e.g. conference program) must be submitted to the Honors Committee in Biology via designated staff member no later than 3 weeks in advance of the intended graduation date.

Student evaluation: Submitted grant proposal and a PDF of submitted poster or of presented seminar PowerPoint slides will be evaluated by the Departmental Honors Committee at an intensive level, using the same rubrics presented above for assessment of Directed Independent Research.

Faculty advisors: The capstone experience will be supervised by one full-time Biology Faculty or approved departmental affiliate with extensive experience.

Application for Biology Undergraduate Honors Research Program

Department of Biological Sciences
Florida Atlantic University

Z #._____

LAST NAME_____FIRST NAME_____MI_____

HOME ADDRESS_____COUNTRY_____

CITY _____STATE_____ ZIP CODE (Int'l Postal Code)_____

FAU EMAIL ADDRESS_____

DAYTIME PHONE_____ EVENING PHONE_____

ADMISSION SEMESTER: ☐ Fall ☐ Spring Year _____

*For questions about the program please contact Mr. Glenn Malone (gmalone@fau.edu).

All applicants must have a Faculty Sponsor to be considered for admission to the Honors Research Program. Please visit our web site at **www.science.fau.edu/biology/pages/faculty.htm** to identify a biology faculty member or approved affiliate faculty member in your area of research interest. The faculty sponsor must document their willingness to sponsor the student's intended research project by completing the Honors Research Faculty Sponsor Verification Form (see Forms and Policies at biology.fau.edu). The form should be submitted by the faculty sponsor directly to the departmental Honors Committee through the Honors Program Assistant, Mr. Glenn Malone (gmalone@fau.edu).

Note: Students seeking faculty mentors must contact their faculty of interest directly. Each faculty member will have a limited capacity to take on student researchers and may not have space available in their lab at the time of your inquiry. To increase the likelihood of confirming a sponsor, it is recommended that students identify and contact multiple potential faculty sponsors. Students may contact Mr. Malone for support in identifying potential sponsors and communication protocols.

Please indicate below the name and email address of your confirmed faculty sponsor:

FACULTY NAME: _____EMAIL:_____

Indicate two areas of research interest (these choices are not binding):

____Animal Behavior	____Physiology
____Biotechnology	____Conservation Biology
____Botany	____Micro & Molecular Biology
____Ecology	____Marine Biology
____Zoology	____Genetics
____Neuroscience	____ Biomedical Science
____Environmental	____ Other (please specify):

If you have specific skills applicable to biological research (e.g. specific laboratory, statistical and or field research skills), please indicate them below:

_____

_____

_____

_____

In what semester and year do you anticipate graduating?

_____

What future academic and or career goals will you pursue on completion of your undergraduate degree?

_____

_____

_____

List any memberships you currently hold in professional and honor societies.

_____

_____

_____

List any honors and awards you have received:

_____

_____

_____

Biology Honors Research Program Eligibility Requirements

IN ORDER TO APPLY FOR THE BIOLOGICAL SCIENCES UNDERGRADUATE RESEARCH HONORS THESIS PROGRAM YOU MUST MEET THE FOLLOWING REQUIREMENTS:

1. Confirm a faculty mentor/sponsor.

2. Have a minimum overall GPA $\geq$ 3.2

3. Core Course Requirements

Applicants much have successfully completed the following courses prior to applying:

Biodiversity + Lab (BSC 1011 + BSC 1011L)
Bioprinciples + Lab (BSC 1010 + BSC 1010L)
General Chemistry I + Lab (CHM 2045 + CHM 2045L)
General Chemistry II + Lab (CHM 2046 + CHM 2046L)

It is recommended but not required that students have also completed the following courses prior to applying:

Organic Chemistry I (CHM 2210)
Methods of Calculus (or higher) (MAC 2233)
One course in Statistics from:
- Introduction to Biostatistics (STA 3173)
- Experimental Design and Statistical Inference (PSY 3234)

DEADLINES AND APPLICATION REQUIREMENTS

Fall application deadline: July 20th **Spring Application Deadline: October 20th**

APPLICATION CHECKLIST:

A complete application will contain all of the below listed items. Incomplete applications will not be considered.

- ☐ Unofficial Transcript
- ☐ Letter of Application (including long term goals, program goals and how this program will support you in achieving your long term goals)
- ☐ *Signed Honors Research Faculty Sponsor Verification Form
- ☐ *One letter of recommendation from a faculty member other than the Faculty Sponsor
- ☐ Resume (including education, work experience, volunteering, etc)
- ☐ Statement of Purpose (what are your long term goals in life and how will this program help you achieve your goals)
- ☐ Completed application form
- ☐ Publications (copy) - OPTIONAL
- ☐ Relevant certifications (copy) – OPTIONAL

*The Faculty Sponsor Verification Form and letters of recommendation should be submitted by the sponsor and letter writers directly to Mr. Glenn Malone (gmalone@fau.edu).

For further instructions please contact Mr. Glenn Malone (gmalone@fau.edu). Students will receive the Honors Committee's admission decision via e-mail before Fall/Spring (depending upon application semester) classes begin.

Send all application materials to:

Florida Atlantic University
John D MacArthur Campus
Department of Biology
ATTN: Mr. Glenn Malone
Building MC-19, Room 108
5353 Parkside Drive
Jupiter, FL 33458

Florida Atlantic University
Boca Raton Campus
Department of Biology
ATTN: Mr. Glenn Malone
Building SC-1, Room 136
777 Glades Road
Boca Raton, FL 33431

I certify that the information given in this application is complete and accurate.
Should any of this information change prior to my entry into the Biological Sciences Honors Research Program, I will immediately notify the Department of Biological Sciences.

Printed Name _____

Signature_____ Date_____

For additional information regarding our program, please visit our departmental web-site at biology.fau.edu.

Biology Undergraduate Honors Research Program
Department of Biological Sciences
Florida Atlantic University

Biology Honors Research Faculty Sponsor Verification Form

To: Honors Committee

DATE: _____

I have agreed to be the Faculty Sponsor for:

_____
Please print student name

Faculty Advisor name: _____
Print name

Faculty advisor signature: _____

As Faculty Sponsor, I agree to sponsor ____(student's name)____'s Biology Undergraduate Honors Research project by providing the necessary training, mentoring and funding for research materials.

Semester: Spring_____

Title of proposed research project: _____
_____
_____
_____

Biological Sciences

Faculty:
Murphey, R., Chair; Baldwin, J.; Benscoter, B.; Binninger, D.; Brooks, W. R.; Caruso, J.; Dorn, N.; Esiobu, N.; Frazier, E.; Gawlik, D.; Godenschwege, T.; Hartmann, J. X.; Hughes, C.; Jia, K.; Kajiura, S.; Koch-Rose, M.; Kumi-Diaka, J.; Lyons, H. J.; Milton, S.; Narayanan, R.; Noonburg, E.; Proffitt, E.; Salmon, M.; Theisen, T.; Weissbach, H.; Wyneken, J.; Zhang, X-H.

The Department of Biological Sciences offers undergraduate degree programs leading to the Bachelor of Arts (B.A.) degree and Bachelor of Science (B.S.) degree. A grade of "C-" or better (unless otherwise noted in the course description) is required in all biology AND cognate courses taken as part of the requirements for an undergraduate degree in Biological Sciences. However, students must maintain a "C" average in departmental major courses. The department also offers an Honors Program, a minor in Biological Sciences and an undergraduate certificate program in Biotechnology. A Bachelor of Science (B.S.) in Neuroscience and Behavior is offered jointly with the Department of Psychology. This major is detailed under the Psychology Department section.

Master's-level degree programs include the Master of Science (M.S.), the Master of Science in Teaching (M.S.T.) and a Professional Science Master's Degree in Business Biotechnology.

Two combined programs are also available. In one, students earn a B.S./M.S. in Biological Sciences and in the other, a B.S. in Biological Sciences and an M.S. in Environmental Science.

Recency of Undergraduate Credits Transfer Policy

No credits more than 10 years old may be transferred into or applied to an FAU Biology undergraduate program. Any credits that are transferred in are considered earned in the first semester of enrollment at FAU.

Link to Bachelor of Science Program

Link to Additional Undergraduate Offerings

Link to Combined Programs

Link to Master's Programs

Bachelor of Arts Degree

(Minimum of 120 credits required)

The Bachelor of Arts (B.A.) degree is intended to provide maximum flexibility for students pursuing study in interdisciplinary areas such as environmental science or secondary school teaching. In addition to the University and College degree requirements, students seeking a Bachelor of Arts degree in Biological Sciences must complete the following core requirements. All degree programs require a total of 120 credits, 45 of which must be upper-division credits.

Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the *Transfer Student Manual.*

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

Core Requirements	**40-41**

Biological Principles and Lab	BSC 1010, 1010L	4
Biodiversity and Lab	BSC 1011, 1011L	4
Select at least three of the following four courses:		
Genetics	PCB 3063	4
Cell Biology	PCB 3023	3
Principles of Ecology	PCB 4043	3
Evolution	PCB 3674	3
General Chemistry 1	CHM 2045	3
General Chemistry 1 Lab	CHM 2045L	1
General Chemistry 2	CHM 2046	3
General Chemistry 2 Lab	CHM 2046L	1
Organic Chemistry 1	CHM 2210	3
Organic Chemistry 2	CHM 2211	3
Methods of Calculus	MAC 2233	3
Experimental Design and Statistical Inference	PSY 3234	3
Physical Science	PSC 2121	3

Biology Electives		**15**
Select at least 15 credits from the list below:		
Biochemistry 1	BCH 3033	3
Vascular Plant Anatomy and Lab	BOT 3223, 3223L	4
Marine Botany and Lab	BOT 4404, 4404L	4
Principles of Plant Physiology and Lab	BOT 4503, 4503L	4

Plant Biotechnology	BOT 4734C	3
Biotechnology 1 Lab	BSC 4403L	2
Biotechnology 2 Lab	BSC 4427L	2
Biology of Cancer	BSC 4806	3
Directed Independent Study	BSC 4905	1-3
Honors Research	BSC 4917	3
Honors Thesis	BSC 4918	3
Special Topics (Model Systems Genetics Lab)	BSC 4930	3
Organic Chemistry Lab	CHM 2211L	2
General Microbiology and Lab	MCB 3020, 3020L	4
Medical Bacteriology	MCB 4203	3
Microbial Ecology	MCB 4603	3
Marine Biodiversity and Lab	OCB 4032, 4032L	4
Marine Biology and Lab	OCB 4043, 4043L	4
Marine Microbiology and Molecular Biology and Lab	OCB 4525, 4525L	4
Marine Ecology and Lab	OCB 4633, 4633L	4
Marine Science	OCE 4006	4
Issues in Human Ecology	PCB 3352	3
Human Morphology and Function 1 and Lab	PCB 3703, 3703L	4
Human Morphology and Function 2 and Lab	PCB 3704, 3704L	4 **or**
Immunology	PCB 4233	3
Molecular Genetics	PCB 4522	3
Comparative Animal Physiology and Lab	PCB 4723, 4723L	4

Reproductive Endocrinology	PCB 4803	3
Cellular Neuroscience and Disease	PCB 4842	3
Practical Cell Neuroscience	PCB 4843C	3
Invertebrate Zoology and Lab	ZOO 2203, 2203L	5
Functional Biology of Marine Animals and Lab	ZOO 4402. 4402L	4
Ornithology and Lab	ZOO 4472, 4472L	4
Comparative Vertebrate Morphogenesis and Lab	ZOO 4690, 4690L	5

Note: PHY 2053 may be substituted for PSC 2121.

Environmental Sciences Focus
Complete all of the above and the following electives.

Biology Elective		
Issues in Human Ecology	PCB 3352	3 **or**
Environment and Society	EVR 2017	3

General Electives		
Macroeconomics	ECO 2013	3
Microeconomics	ECO 2023	3
Environmental Economics	ECP 4302	3
Environmental Ethics	PHI 3640	3

Top

Bachelor of Science Degree
(Minimum of 120 credits required)

The Bachelor of Science (B.S.) degree is recommended for students planning to be professional biologists in industry or governmental service, for graduate work in the biological sciences and for students planning careers in medicine, dentistry or veterinary medicine. In addition to the University and College degree requirements, students seeking a Bachelor of Science degree in Biological Sciences must complete the following degree requirements.

Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the *Transfer Student Manual.*

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

Core Requirements (47-49 credits)		
Biological Principles and Lab	BSC 1010, 1010L	4
Biodiversity and Lab	BSC 1011, 1011L	4
General Chemistry 1 and Lab	CHM 2045, 2045L	4
General Chemistry 2 and Lab	CHM 2046, 2046L	4
Organic Chemistry 1	CHM 2210	3
Organic Chemistry 2	CHM 2211	3
Methods of Calculus	MAC 2233	3 **or**
Calculus with Analytic Geometry 1	MAC 2311	4
College Physics 1	PHY 2053	4 **or**
General Physics 1	PHY 2048	4
College Physics 2	PHY 2054	4 **or**
General Physics 2	PHY 2049	4
General Physics 1 Lab	PHY 2048L	1
General Physics 2 Lab	PHY 2049L	1
Experimental Design and Statistical Inference	PSY 3234	3 **or**
Introduction to Biostatistics	STA 3173	3
Select at least three of the courses below ***(the other may be used as an elective)***		
Genetics	PCB 3063	4

Cell Biology	PCB 3023	3
Principles of Ecology	PCB 4043	3
Evolution	PCB 3674	3

Electives (select at least 21 credits from the list below) *(The Department of Psychology and Department of Biological Sciences jointly administer the Neuroscience and Behavior major. Thus, Biology majors may choose electives from that program list as well.)*		
Biochemistry 1	BCH 3033	3
Vascular Plant Anatomy and Lab	BOT 3223, 3223L	4
Marine Botany and Lab	BOT 4404, 4404L	4
Principles of Plant Physiology and Lab	BOT 4503, 4503L	4
Plant Biotechnology	BOT 4734C	3
Biotechnology 1 Lab	BSC 4403L	2
Biotechnology 2 Lab	BSC 4427L	2
Biology of Cancer	BSC 4806	3
Directed Independent Study	BSC 4905	1-3
Honors Research	BSC 4917	3
Honors Thesis	BSC 4918	3
Special Topics (Model Systems Genetics Lab)	BSC 4930	3
Organic Chemistry Lab	CHM 2211L	2
Critical Thinking in Environmental Science	EVS 4021	3
General Microbiology and Lab	MCB 3020, 3020L	4
Medical Bacteriology	MCB 4203	3
Microbial Ecology	MCB 4603	3

Marine Biodiversity and Lab	OCB 4032, 4032L	4
Marine Biology and Lab	OCB 4043, 4043L	4
Marine Microbiology and Molecular Biology and Lab	OCB 4525, 4525L	4
Marine Ecology and Lab	OCB 4633, 4633L	4
Marine Science	OCE 4006	4
Issues in Human Ecology	PCB 3352	3
Human Morphology and Function 1 and Lab	PCB 3703, 3703L	4
Human Morphology and Function 2 and Lab	PCB 3704, 3704L	4 **or**
Immunology	PCB 4233	3
Molecular Genetics	PCB 4522	3
Comparative Animal Physiology and Lab	PCB 4723, 4723L	4
Reproductive Endocrinology	PCB 4803	3
Cellular Neuroscience and Disease	PCB 4842	3
Practical Cell Neuroscience	PCB 4843C	3
Invertebrate Zoology and Lab	ZOO 2203, 2203L	5
Functional Biology of Marine Animals and Lab	ZOO 4402. 4402L	4
Ornithology and Lab	ZOO 4472, 4472L	4
Comparative Vertebrate Morphogenesis and Lab	ZOO 4690, 4690L	5

Students should consult their faculty advisor concerning additional courses that may be applied to their degree requirements.

Honors in the Major – Biological Sciences

Eligible undergraduate students may apply to participate in the Department of Biological Sciences' Honors in the Major program. There are two paths to attaining Honors in the Major. Students who successfully fulfill all requirements associated with one of the below biology honors pathways and have a final cumulative GPA of 3.2 or greater at the time of degree conferral will receive a designation of Honors in the Major on their transcript. The transcript designations "Honors in Biological Sciences – Research Thesis" or "Honors in Biological Sciences – Research" will mark participation in the below described respective paths.

~~Biology Honors Thesis Program~~ Honors in Biological Sciences – Research Thesis

The Department of Biological Sciences offers an Honors Thesis Program that recognizes research accomplishments of talented undergraduates. Eligible students must have a minimum of 20 credits in biology and an overall GPA of 3.2. Students usually begin the program in their junior year and conduct independent, supervised research during their junior and senior years. A written paper and a seminar describing the results of their research are required in the senior year. Interested students should contact the faculty member whose research interests are closest to those the student wishes to pursue.

Honors in Biological Sciences – Research

The Department of Biological Sciences offers an Honors Research Program that recognizes research accomplishments of talented undergraduates. Eligible students must have a minimum of 20 credits in biology and an overall GPA of 3.2. Students usually begin the program in their junior year and conduct independent, supervised research during their junior and senior years. Submission of a grant proposal is required no later than the second semester of the junior year. Presentation of a poster or seminar at a local, regional, national or international research conference/symposium describing the results of their research is required in the senior year. Interested students should contact the faculty member whose research interests are closest to those the student wishes to pursue. For more information, see http://biology.fau.edu/academics/undergraduate/research.php.