

Biology Major Checklist for the Specialization in Quantitative Biology and Bioinformatics

Name: _____

SB ID: _____

Today's Date: _____

Pre Health Interest: _____

Overall GPA: _____

Anticipated Graduation Date: _____

Please refer to the Undergraduate Bulletin for the official policy, full course options, and requirements in detail.

Foundational Courses in Related Fields

At least one semester of the two-semester sequences of required courses in calculus, general chemistry lecture, organic chemistry lecture, and physics lecture/lab must be passed with a letter grade of C or higher.

General Chemistry

General Chemistry 1	
General Chemistry 1 lab	
General Chemistry 2	
General Chemistry 2 lab	

OR

Molecular Science 1	
Molecular Science 1 lab	

Organic Chemistry

Organic Chemistry 1	
Organic Chemistry 2	
Organic Chemistry lab	

OR

Molecular Science 2	
Molecular Science 3	
Molecular Science 2 lab	

Calculus*, Statistics and Physics**

Calculus Semester 1	
Calculus Semester 2	

Physics Semester 1	
Physics Lab Semester 1	
Physics Semester 2	
Physics Lab Semester 2	

Statistics: BIO 211, AMS 110 or AMS 310	
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* The A, B, C sequence of calculus requires 3 semesters of calculus lecture in the Quantitative Biology and Bioinformatics Specialization.

** The Classical Physics A, B, C sequence requires 3 semesters of physics lecture.

Core Courses in Biology Lecture courses

BIO 201: Organisms to Ecosystems	
BIO 202: Molecular and Cellular Biology	
BIO 203: Cellular and Organ Physiology	

Lab Courses

BIO 204	
BIO 205 or BIO 207	

Stony Brook Curriculum Courses

BIO 458: Speak Effectively Before an Audience (SPK)	
BIO 459: Write Effectively in Biology (WRTD)	

Advanced Course Requirements for the Specialization in Quantitative Biology and Bioinformatics

The list of Advanced BIO Courses and Accepted Electives can be found on the back of this page. The Specialization in Quantitative Biology and Bioinformatics requires:

- AMS 333 Mathematical Biology
- BIO 332 Computational Modeling of Physiological Systems
- BIO 312 Bioinformatics and Computational Biology
- One of the following related lecture courses: BIO 304, BIO 317, BIO 320, BIO 321, CHE 346, EBH 380
- Two additional advanced lecture courses, with at least one being from Area III or Area IV from the list of Advanced BIO Courses and Accepted Electives.
- One additional advanced laboratory course from any Area. Note: the elective advanced laboratory course can be replaced by two semesters of independent research for a total of at least 4 credits in a BIO research course.
- Additional advanced lecture, laboratory, reading, or independent research courses, as needed, for a minimum of 20 credits of advanced biology coursework.

Required Specialization Courses

AMS 333	
BIO 332	
BIO 312	
Related Lecture Course	

Outside of Specialization Lecture Courses

Outside of Specialization Lab Course

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Advanced Course Credit Total (20 Credit Minimum)	
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Upper-Division Writing Requirement

The advanced writing component of the major in Biology requires registration in the 0-credit BIO 459 and approval of either a term paper or a laboratory report written for an advanced course in the biological sciences at Stony Brook.

Upper-Division Writing Requirement	
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Transfer students must take at least 15 credits of required core and advanced biology at Stony Brook in courses for majors at the 200 level or higher. Both of the two advanced laboratory experiences must be taken at Stony Brook.

Advanced BIO Courses and Accepted Electives for the Biology Major

The advanced BIO courses and Accepted Electives are listed below in groupings that correspond to four broad areas of biology. The advanced courses are listed below as: Course Indicator, Course Name, Course Type (lecture or lab), and semester usually offered. Please refer to the Undergraduate Bulletin for the most up-to date list including full course options, descriptions, policies, and pre-requisites in detail.

Area I: Biochemistry, Molecular and Cellular Biology:

- BIO 310 Cell Biology (Lec)(SPRING)
- BIO 312 Bioinformatics and Computational Biology (Lec/Lab)(FALL) ♦
- BIO 314 Cancer Biology (Lec)(FALL)
- BIO 316 Molecular Immunology (Lec)(SUMMER)
- BIO 320 General Genetics (Lec)(SPRING) ♦
- BIO 361 Biochemistry I (Lec)(FALL)
- BIO 362 Biochemistry II (Lec)(SPRING)
- BIO 364 Laboratory Techniques in Cancer Biology (Lab)(FALL) ♦
- BIO 365 Biochemistry Laboratory (Lab)(FALL) ♦
- BIO 368 Food Microbiology Laboratory (Lec)
- AMS 333 Mathematical Biology (Lec)(FALL)
- BIO 511 Topics in Biotechnology (Lab)(SPRING)
- BME 304 Genetic Engineering (Lec)(SPRING)
- BME 404 Essentials of Tissue Engineering (Lec)(SPRING)
- CHE 346 Biomolecular Structure and Reactivity (Lec)(FALL)
- EBH 302 Human Genetics (Lec)(FALL) ♦
- EBH 370 Advanced Human Genetics (Lec/Lab)(SPRING)

Area II: Neurobiology and Physiology

- BIO 317 Principles of Cellular Signaling (Lec)(FALL)
- BIO 328 Mammalian Physiology (Lec)(SPRING)
- BIO 332 Computational Modeling of Physiological Systems(Lec)(SPRING)
- BIO 334 Principles of Neurobiology (Lec)(SPRING)
- BIO 335 Neurobiology Laboratory (Lab)(FALL) ♦
- BIO 337 Neurotransmission and Neuromodulation: Implications for Brain Function (Lec)(SPRING)
- BIO 338 Selforganization of the Brain (Lec)(FALL)
- BIO 339 Molecular Development of the Nervous System(Lec)(SPRING)
- BIO 347 Introduction to Neural Computation (Lec) (FALL)
- BIO 369 Animal Nutrition (Lec) (SPRING)
- BCP 401 Principles of Pharmacology (Lec)(FALL)
- BME 301 Bioelectricity (Lec)(SPRING)
- BME 303 Biomechanics (Lec)(FALL)
- EBH 316 The Evolution of the Human Brain (Lec)(SPRING)
- EBH 331 Hormones and Behavior (Lec)
- NEU 517 Principals of Cell Signaling (Lec) (FALL)

Area III: Organisms

- BIO 315 Microbiology (Lec)(SPRING)
- BIO 325 Animal Development (Lec)(FALL)
- BIO 327 Developmental Genetics Laboratory (Lab)(SPRING) ♦
- BIO 340 Zoolology (Lec/Lab)
- BIO 341 Plant Diversity (Lec/Lab) (SPRING)
- BIO 342 Invertebrate Zoology (Lec) (FALL)
- BIO 343 Invertebrate Zoology Laboratory (Lab)(FALL)
- BIO 344 Chordate Zoology (Lec/Lab)(SPRING) ♦
- BIO 348 Diversity and Evolution of Reptiles and Amphibians (Lec)
- BIO 366 Molecular Microbiology Laboratory (Lec/Lab)(FALL) ♦
- BIO 515 Current Topics in Microbiology (Lab)(FALL)
- BIO 380 Entomology (Lec/Lab)
- MAR 370 Marine Mammals (Lec)(FALL)
- MAR 375 Marine Mammal/Sea Turtle Rehab. (Lec) (SPRING)
- MAR 376 Biology & Conservation/ Sea Turtles (Lec) (FALL)
- MAR 377 Biology & Conservation/Sea Birds (Lec) (SPRING)
- MAR 380 Ichthyology (Lec/Lab) (FALL)

♦ Indicates that the upper division writing requirement can be completed in the course

Area IV: Ecology and Evolution

- BIO 319 Landscape Ecology Laboratory (Lab)(FALL)
- BIO 321 Introduction to Ecological Genetics and Genomics (Lec)(FALL) ♦
- BIO 336 Conservation Biology (Lec)(FALL) ♦
- BIO 350 Darwinian Medicine (Lec)(FALL) ♦
- BIO 351 Ecology (Lec)(FALL)
- BIO 352 Ecology Laboratory (Lab)(FALL) ♦
- BIO 353 Marine Ecology (Lec)(SPRING) ♦
- BIO 354 Evolution (Lec)(FALL) ♦
- BIO 356 Applied Ecology & Conservation Biology Laboratory (Lab)(SPRING)
- BIO 358 Biology & Human Social & Sexual Behavior (Lec)(SPRING)
- BIO 367 Molecular Diversity Laboratory (Lab)(SPRING) ♦
- BIO 371 Restoration of Aquatic Systems (Lec/Lab)(FALL)
- BIO 383 Paleobiology (Lec/Lab)(SPRING)
- BIO 384 Intermediate Statistics (Lec) (FALL)
- BIO 385 Plant Ecology (Lec)(SPRING) ♦
- BIO 386 Ecosystem Ecology & the Global Environ.(Lec)(SPRING) ♦
- ANP 360 Primate Conservation (Lec)
- EBH 359 Behavioral Ecology (Lec)(FALL)
- EBH 380 Genomics (Lec)(FALL) ♦
- EBH 381 Genomics Laboratory (Lec/Lab)(SPRING)
- ENS 311 Ecosystem Ecology and the Global Environ. (Lec, not for credit in addition to BIO 386)(SPRING)
- ENV 301 Sustainability of the Long Island Pine Barrens (Lec)
- MAR 301 Environmental Microbiology (Lec/Lab)(FALL) ♦
- MAR 302 Marine Microbiology and Microbial Ecology (Lec, not for credit in addition to MAR 301)(SPRING)
- MAR 303 Long Island Marine Habitats (Lec/Lab)(FALL)
- MAR 305 Experimental Marine Biology (Lab)(FALL)
- MAR 315 Marine Conservation (Lec)(SPRING)
- MAR 320 Limnology (Lec/Lab)(SPRING)
- MAR 366 Plankton Ecology (Lec)
- MAR 373 Marine Apex Predators: Ecology and Conservation (Lec)(FALL)
- MAR 384 Diseases of Aquatic Organisms (Lec)(SPRING)
- MAR 386 Ecosystem Science for Fisheries Management (Lec)

Study Abroad Course Options in

Area IV Jamaica:

- MAR 388 Tropical Marine Ecology (Lec/Lab)(WINTER)
- Turkana Basin:**
- ANP 304 Modern and Ancient Environments of Eastern Africa (Lec/Lab)
 - ANP 305 Vertebrate Paleontology of the Turkana Basin (Lab) of the Turkana Basin (Lec/Lab)
 - ANP 306 Paleoanthropological Discoveries of the Turkana Basin (Lab)
- Madagascar:**
- ANP 325 Primate Behavior (Lec)
 - ANP 350 Methods of Studying Primates (Lec)
 - ANP 391 Topics in Physical Anthropology (Lec)

Environmental Biology Electives (May only be used for the Environmental Biology Specialization)

- ATM 305 Global Atmospheric Change (Lec)
- ATM 397 Air Pollution and its Control (Lec)(SPRING)
- MAR 318 Engineering Geology and Coastal Processes (Lec)
- MAR 333 Coastal Oceanography (Lec)(SPRING)