



# Becoming a Biology Teacher

## Three Routes to New York State Certification

The State University of New York at Stony Brook offers three programs registered and approved by the New York State Education Department for individuals seeking New York State certification to teach biology in secondary schools, grades 7 - 12:

The **undergraduate** route to certification requires completion of a Bachelor of Science in Biology with the Teacher Preparation option. (See page 2)

The **graduate** route to certification requires completion of the Master of Arts in Teaching degree, as well as completion of science course requirements equivalent to the Stony Brook Bachelor of Arts in Biology degree. (See page 5)

The **five year combined BS/MAT** route to certification makes it possible to complete two degrees at the same time: Bachelor of Science in Biology and Master of Arts in teaching Biology. (See page 8)

The Stony Brook program is aligned with the standards of the National Science Teachers Association (NSTA), National Council for Accreditation of Teacher Education (NCATE), the National Educators Association (NEA) Code of Ethics, Interstate New Teacher Assessment and Support Consortium (INTASC), and the National Board for Professional Teacher Standards (NBPTS).

**Undergraduates:** For advisement, contact the Biology Major Advisor, Ellen Lopez, in the Biology Undergraduate Program Office in the Biology Learning Laboratories Building, (631) 632-8530. Email inquiries to [elopez@notes.cc.sunysb.edu](mailto:elopez@notes.cc.sunysb.edu).

**Graduates:** For advisement, contact MAT Biology Advisor, Dr. Zuzana Zachar at (631) 632-8970 or [zzachar@ms.cc.sunysb.edu](mailto:zzachar@ms.cc.sunysb.edu) or stop by Room 094 in the Life Science Building and speak to Ms. Judy Nimmo.

**Science Education Program:** The Director of Science Education is Dr. Keith Sheppard, [Keith.Sheppard@stonybrook.edu](mailto:Keith.Sheppard@stonybrook.edu), (631) 632-2989, and the Assistant Director of Science Education is Linda Padwa, [Linda.Padwa@stonybrook.edu](mailto:Linda.Padwa@stonybrook.edu), (631) 632-7075.

## **Undergraduate Biology Teacher Preparation Program Degree and Certification Requirements**

The undergraduate biology teacher preparation program is based on completion of a major program in biology and a minor in secondary education. The undergraduate program requires over 65 science credits and includes a strong foundation in biology, chemistry, physics, mathematics and research. Laboratory work comprises a significant portion of these credits, and an exhibition of written expression is required.

NOTE: Biology majors preparing for New York State Teacher Certification must take a total of **36 credits** of biology, which is beyond the requirement for the biology major that is completed by students preparing for employment as biologists or for graduate study.

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All applicants to the Biology Teacher Preparation Program must:

- Apply to the program during second semester of sophomore year.
- Have taken at least 4 science lab courses.
- Achieve a 2.75 cumulative GPA and a 2.75 GPA in science courses.
- Contact the biology major advisor for a transcript review and to plan a course of study.
- Contact one of the science education program advisors for an interview (see front page for details).
- Fill out the Professional Education Program Undergraduate Application Form (see <http://www.sunysb.edu/pep/docs/UnderAppForm.doc>). Attach an unofficial copy of your transcript(s), and your essay, and submit all documents for approval by the Science Education Program Director.
- Declare a Teacher Preparation option by submitting the “Declaration of Major/Minor Form” with TP to the Registrar. Forms are available at the Registrar’s Office, the Undergraduate Biology advisor’s office in the Biology Learning Laboratories Building, and the Science Education Program Office, Life Sciences 001.

## Biology Content for Teacher Preparation Option

### A. Biology Core Courses:

1. \_\_\_\_\_ BIO 150 – The Living World (see note 1)
2. \_\_\_\_\_ BIO 201, 202, 203 – Fundamentals of Biology
3. \_\_\_\_\_ BIO 204, 205 – Fundamental of Scientific Inquiry in the Biological Sciences

### B. Courses Required in Related Fields:

1. \_\_\_\_\_ **Calculus:** MAT 125, 126 Calculus A,B or MAT 131, 132 Calculus, I, II or MAT 141, 142 Calculus, I, II Honors or level 8 or 9 on the Mathematics Placement Examination.
2. \_\_\_\_\_ **General Chemistry:** CHE 131 or CHE 129 and 130, CHE 132 General Chemistry and CHE 133, 134 General Chemistry Laboratory or CHE 141, 142 Honors Chemistry and CHE 143, 144 Honors General Chemistry Laboratory.
3. \_\_\_\_\_ **Organic Chemistry:** CHE 321, and either CHE 322 or 326 Organic Chemistry or CHE 331 and 332 Honors Organic Chemistry.
4. \_\_\_\_\_ **Organic Chemistry Laboratory:** CHE 327 Organic Chemistry Laboratory or CHE 383 Introductory Synthetic and Spectroscopic Laboratory Techniques.
5. \_\_\_\_\_ **Physics:** PHY 121/123, PHY 122/124 Physics for Life Sciences and Laboratory or PHY 125, 126, 127 Classical Physics A, B, C or PHY 131/133, 132/134 Physics I, II or PHY 141,142 Classical Physics I, II: Honors.
6. \_\_\_\_\_ **Statistics & Probability:** AMS 110 Probability and Statistics in Life Sciences or AMS 310 Survey of Probability and Statistics.
7. \_\_\_\_\_ **Earth and Space Sciences:** One course in a geoscience area.  
See advisor for details.

### C. Advanced Courses:

#### Advanced Lecture Courses:

Students must complete at least one advanced course in each of the following areas of biology.

**Area I - \_\_\_\_\_ Cell Biology and Biochemistry:** BIO 310, 314, 315, 316, 317#, 318#, 361, 362

**Area II - \_\_\_\_\_ Genetics and Development:** BIO 318#, 320, 325, 339#

**Area III - \_\_\_\_\_ Neurobiology and Physiology:** BIO 317#, 318#, 328, 334, 338, 339#

**Area IV - \_\_\_\_\_ Organisms:** BIO 318#, 340, 341, 343, 344, 348, 380; MAR 370, 371

**Area V - \_\_\_\_\_ Ecology and Evolution:** BIO 301, 318#, 350, 351, 353, 354, 358, 359, 385, 386; MAR 301, 302; ANP 325.02, 350.02, 391.02

**Note:** (#) BIO 317, 318, and BIO 339 may not be used to satisfy more than one Advanced Lecture Area.

**Advanced Laboratory Courses:** Two advanced laboratory courses chosen from any of the six areas below. (NOTE: Only one course may be chosen from each area below.)

**Area I** - \_\_\_\_\_ BIO 311, 365

**Area II** - \_\_\_\_\_ BIO 327

**Area III** - \_\_\_\_\_ BIO 335

**Area IV** - \_\_\_\_\_ BIO 340, 341, 343, 344, 380; MAR 380

**Area V** - \_\_\_\_\_ BIO 352, 356, 367; MAR 301, 303, 305, 320, 388

**Area VI** - \_\_\_\_\_ BIO 312

**Upper Division Writing Requirement:** Students must also fulfill the Upper Division Writing Requirements for the degree in Biology. See the Biology advisor for details.

### **Undergraduate Teaching Practicum in College Biology**

All biology majors seeking secondary biology teaching certification should take four credits of BIO 475/476.

### **Biology Electives**

Additional advanced biology lecture, laboratory, readings and independent research courses, should be taken as needed, to achieve a minimum of 36 credits in requirements A and C. (See note 2.)

### **Notes:**

1. BIO 150 is recommended for students who have not taken high school biology or have not earned a grade of 3 or higher on the Math Placement Test.
2. All biology courses intended for the biology major (and the additional BIO credits needed for New York State Teacher Certification) must be passed with a grade C or higher. It is recommended that students take BIO 475/476 on pass/no credit basis and pass the class with a grade of S (i.e., Satisfactory).
3. A grade of S for readings and research courses applies to the quality requirements within the following credit limitations: four credits of biology independent research (BIO 484, 486, 487, 489) and two credits of tutorial readings (BIO 444, 446, 447, 449) may be applied toward the major.

### **D. Interdisciplinary Seminar Series:**

\_\_\_\_\_ The Nature of Science and the Human Endeavor (required - 4 sessions, 0 credit)

### **E. Required Professional Studies in Education Courses:**

- \_\_\_ PSY 327 Middle Childhood/Adolescent Development
- \_\_\_ SSE 350 Foundations in Education
- \_\_\_ LIN 344 Language Acquisition and Literacy Development
- \_\_\_ SCI 410 Pedagogy and Methods in Science Education I
- \_\_\_ SCI 449 Field Experience I (co-requisite SCI 410)
- \_\_\_ SCI 420 Pedagogy and Methods in Science Education II
- \_\_\_ SCI 450 Field Experience II (co-requisite SCI 420)
- \_\_\_ SCI 451 Supervised Student Teaching 7 – 9
- \_\_\_ SCI 452 Supervised Student Teaching 10 – 12
- \_\_\_ SCI 454 Student Teaching Seminar

Note:

- Prior to admission to student teaching, candidates will be interviewed by a committee to assess the ability to speak extemporaneously about both biology concepts and pedagogical issues. Candidates who are not successful in this interview will be counseled in order to remedy deficiencies. Upon completion of the remediation another interview will be held. In the event that a candidate is unable to satisfy the interview component, the candidate will not advance to student teaching.
- 75 days of student teaching are required. Dependent on the semester and public school vacation schedules, student teaching may extend beyond the university semester calendar. Student teaching is divided into two placements of approximately equal duration, one in a middle school/junior high school and the other in a high school.

### **F. Field Experience:**

Field Experience sites for all teacher candidates are arranged through SCI 449 and SCI 450. Assignments and details are distributed in SCI 410 and SCI 420. New York State requires 100 hours of field experience prior to student teaching.

### **G. State Tests, Mandated Seminars and Fingerprinting:**

All students must earn a passing grade on the Liberal Arts and Sciences Test (LAST) component of the New York State Teacher Certification Exams (NYSTCE) **prior** to student teaching. Before completing the program, students must not only pass the Content Specialty Test (CST) in biology, they must score at least 220 on all sections of the exam. Students with scores lower than 220 on any section of the CST must pass an alternate exam on the concepts of that section administered by the content advisor. The Assessment of Teaching Skills, Written (ATS-W) is also required prior to certification. For further information about the NYSTCE program, visit their website at <http://www.nystce.nesinc.com/>. All students must be fingerprinted during SCI 410 and complete three mandated seminars, *Training in Child Abuse Recognition*, *Substance Abuse Education*, and *School Violence and Intervention*, prior to student teaching. For details see <http://www.sunysb.edu/spd/career/tworkshops.html>.

### **H. Language Requirement:**

New York State certification requires at least six credits of college level study of a foreign language.

### **I. Professional Portfolio:**

The Professional Portfolio is presented and defended at the conclusion of student teaching. It includes many performance indicators of standards-based teaching competencies.

## Master of Arts in Teaching Biology

**Admission requirements:** BS degree in biology (including two semesters chemistry, two semesters organic chemistry, two semesters physics, one semester geoscience, at least one semester of calculus, and one semester of statistics); GPA of 2.75 overall, and GPA of 3.0 in sciences.

The faculty advisor for the MAT in Biology program is Dr. Zuzana Zachar, 631-632-8970; email: [zzachar@notes.cc.sunysb.edu](mailto:zzachar@notes.cc.sunysb.edu).

**Application:** For application materials log on to <http://www.sunysb.edu/spd/graduate/matscience.html>

### Courses:

The program consists of 41 credits as follows: 15 credits content courses, 17 credits pedagogy and methods courses, 9 credits student teaching.

#### A. Required Core Science Courses:

##### Three courses from the following list:

- \_\_\_\_\_ CEB 546 Current Topics in Biotechnology
- \_\_\_\_\_ CEB 547 Current Topics in Molecular Genetics
- \_\_\_\_\_ CEB 553 Biology & Human Behavior
- \_\_\_\_\_ CEB 554 Current Topics in Immunology
- \_\_\_\_\_ CEB 556 Ecology

##### Two courses from the following list:

- \_\_\_\_\_ CEB 505 History of the Long Island Environment
- \_\_\_\_\_ CEB 547 Forensic Science
- \_\_\_\_\_ CEB 548 Current Topics in Microbiology
- \_\_\_\_\_ CEB 549 Laboratory Science Curriculum Development
- \_\_\_\_\_ CHE 593 Chemical Demonstrations

In addition, you may choose a content course from one of the Masters or PhD programs in Marine Science, Genetics, Molecular & Cellular Biology and Ecology & Evolution. The MAT Biology director's approval is required prior to registration for courses within these programs.

#### B. Required Professional Studies in Education Courses:

- \_\_\_\_\_ CEE 505 Education: Theory and Practice
- \_\_\_\_\_ PSY 595 Human Development
- \_\_\_\_\_ LIN 544 Language Acquisition and Literacy Development
- \_\_\_\_\_ SCI 510 Pedagogy and Methods in Science Education I
- \_\_\_\_\_ SCI 549 Field Experience I (co-requisite SCI 510)
- \_\_\_\_\_ SCI 520 Pedagogy and Methods in Science Education II
- \_\_\_\_\_ SCI 550 Field Experience II (co-requisite SCI 520)
- \_\_\_\_\_ SCI 551 Supervised Student Teaching 10 – 12
- \_\_\_\_\_ SCI 552 Supervised Student Teaching 7 – 9
- \_\_\_\_\_ SCI 554 Student Teaching Seminar

### **C. Interdisciplinary Seminar Series:**

\_\_\_\_ The Nature of Science and the Human Endeavor (required - 4 sessions, 0 credit)

### **D. Field Experience:**

Field Experience sites for all teacher candidates are arranged through SCI 549 and SCI 550. Assignments and details are distributed in SCI 510 and SCI 520. New York State requires 100 hours of field experience prior to student teaching.

### **E. State Tests, Mandated Seminars and Fingerprinting:**

All students must earn a passing grade on the Liberal Arts and Sciences Test (LAST) component of the New York State Teacher Certification Exams (NYSTCE) prior to student teaching. Before completing the program, students must not only pass the Content Specialty Test (CST) in biology, they must score at least 220 on all sections of the exam. Students with scores lower than 220 on any section of the CST must pass an alternate exam on the concepts of that section administered by the content advisor. The Assessment of Teaching Skills, Written (ATS-W) is also required prior to certification. For further information about the NYSTCE program, visit their website at <http://www.nystce.nesinc.com/>.

All students must be fingerprinted during SCI 510 and complete three mandated seminars, *Training in Child Abuse Recognition*, *Substance Abuse Education*, and *School Violence and Intervention*, prior to student teaching. For details see <http://www.sunysb.edu/spd/career/tworkshops.html>

### **F. Language Requirement:**

New York State certification requires 6 credits of a foreign language. Bilingual students may satisfy this requirement by taking the CLEP exam in foreign language. ([http://www.collegeboard.com/student/testing/clep/ex\\_foreign.html](http://www.collegeboard.com/student/testing/clep/ex_foreign.html))

### **G. Professional Portfolio:**

The Professional Portfolio is presented and defended at the conclusion of student teaching. It includes many performance indicators of standards-based teaching competencies and a Master's Essay.

### **H. Student Teaching:**

Prior to admission to student teaching, candidates will be interviewed by a committee to assess the ability to speak extemporaneously about both biology concepts and pedagogical issues. Candidates who are not successful in this interview will be counseled in order to remedy deficiencies. Upon completion of the remediation another interview will be held. In the event that a candidate is unable to satisfy the interview component, the candidate will not advance to student teaching.

75 days of student teaching are required. Dependent on the semester and public school vacation schedules, student teaching may extend beyond the university semester calendar. Student teaching is divided into two placements of approximately the same duration, one in a middle school/junior high school and the other in a high school.

## **Five Year BS/MAT Biology Teacher Preparation Program Degree and Certification Requirements**

The BS/MAT program in Biology Education is based upon the completion of a combined BS in Biology and Master of Arts in Teaching in Biology. It is possible to complete both degrees in 5 years (instead of 5 ½ years) because of credit sharing between the programs. This program requires a combination of the courses that are required for each of the individual degree programs.

Applicants to the BS/MAT Biology Teacher Preparation Program must:

- Have taken at least 4 science lab courses
- Contact the biology education advisor (Ms. Ellen Lopez in the Biology Undergraduate Program Office, Biology Learning Laboratories Building, (631) 632–8530) for a transcript review and to plan a course of study
- Achieve a cumulative GPA of 3.00 and a GPA of 3.00 in science courses
- Apply for the combined program during junior year
- Complete the BS/MAT application that is found on the School of Professional Development web site ([www.sunysb.edu/spd](http://www.sunysb.edu/spd)).
  - SPD Student Application/Information Sheet
  - Three (3) letters of recommendation
  - Official transcript from each college or university attended
  - Any additional items required by SPD
- Submit application prior to SPD deadline  
(for Fall admission: March 31; for Spring admission: October 31)

Upon entry to the program, candidates must declare a Teacher Preparation option along with their Undergraduate major by submitting the “Declaration of Major/Minor Form” with TP to the Registrar. Forms are available at the Registrar’s Office, the Undergraduate Biology advisor’s office in the Biology Learning Laboratories Building, and the Science Education Program Office, Life Sciences 001.

### **Number of semesters of full-time study required for program completion at the undergraduate and graduate levels.**

Students should apply to the combined BS/MAT program during their fifth or sixth semester of study. The first six semesters of the program are full time study at the undergraduate level. Semesters seven and eight will include a mix of undergraduate and graduate courses. Semesters nine and ten will consist of graduate courses only. Candidates will generally advance to Graduate status during their eighth semester.

Note: The two degrees are conferred only when the entire combined degree program has been completed. Both degrees are conferred together unless the student elects to exit the combined degree program and receive only a BS in Biology. Students must maintain a B average in their graduate courses. Students who are unable to maintain this average in their graduate studies will be encouraged, while in Semester 8 of their studies, to leave the program and graduate with a BS degree in Biology.

## Biology BS/MAT Sample Course Sequence

	UG	G		UG	G
<b>semester 1 (Fall)</b>				<b>semester 6 (Spring)</b>	
CHE 129/130 or CHE 131	4		PHY 122/124	4	
CHE 133	1		BIO Area IV	3	
MAT 125	3		Bio lab	3	
SBU 101	1		DEC	3	
DEC	3		GEO 102/112	4	
DEC	3				
<b>semester 2 (Spring)</b>				<b>semester 7 (Fall)</b>	
	4		<u>Bio Area V (and DEC H)</u> BIO 351	3	
CHE 132			Bio lab	3	
CHE 134	1		<u>GRAD 1/Area 1</u> CEB 548		3
MAT 126	3		LIN 344	3	
BIO 201, 202 or 203	3		CEE 505		3
DEC	3				
SBU 102	1				
<b>semester 3 (Fall)</b>				<b>semester 8 (Spring)</b>	
CHE 321	3		DEC	3	
BIO 201 or 202	3		PSY 595		3
			<u>GRAD 2 / Area V</u> CEB 553 Human Biology		3
BIO 204	2		SCI 510		3
CHE 327 or AMS 110	2 or 3		SCI 549		1
DEC	3		DEC	3	
DEC	3				
<b>semester 4 (Spring)</b>				<b>semester 9 (Fall)</b>	
CHE 322	3		SCI 520		3
CHE 327 or AMS 110	2 or 3		SCI 550		1
	3		<u>Grad 3 / Area I</u> CEB 554 Immunology		3
BIO 201, 202 or 203			<u>Grad 4/ area II</u> CEB 547 Genetics		3
BIO Area II	3		Grad 5 Biology Elective		3
BIO 205	2				
DEC	3				
<b>semester 5 (Fall)</b>				<b>semester 10 (Spring)</b>	
PHY 121/123	4		SCI 551		3
BIO Area Elective	3		SCI 552		3
BIO Area III	3		SCI 554		3
DEC	3				
DEC	3				

The above listing of courses provides a suggested sequence for coursework. There is a degree of flexibility in the order of courses, but any deviation from the above without permission of the biology teacher preparation advisor may lead to a delay in completion of the program.

A student wishing to complete the 5 year combined program is strongly encouraged to consult with the biology teacher preparation advisor for individualized guidance in course selection.

## Additional Requirements

### **Interdisciplinary Seminar Series:**

The Nature of Science and the Human Endeavor (4 sessions, 0 credit, required).

### **Student Teaching:**

Seventy five days of student teaching are required. Depending on the semester and public school vacation schedules, student teaching may extend beyond the university semester calendar. Student teaching is divided into two placements of approximately equal duration, one in a middle school/junior high school and the other in a high school.

Prior to admission to student teaching, candidates will be interviewed by a committee to assess their ability to speak extemporaneously about both biology concepts and pedagogical issues. Candidates who are not successful in this interview will be counseled in order to remedy deficiencies. Upon completion of the remediation another interview will be held. In the event that a candidate is unable to satisfy the interview component, the candidate will not advance to student teaching.

### **Field Experience:**

Field Experience sites for all teacher candidates are arranged through SCI 449/549 and SCI 450/550. Assignments and details are distributed in SCI 410/510 and SCI 420/520. New York State requires 100 hours of field experience in secondary schools prior to student teaching.

### **State Tests, Mandated Seminars and Fingerprinting:**

All students must earn a passing grade on the *Liberal Arts and Sciences Test* (LAST) component of the New York State Teacher Certification Exams (NYSTCE) **prior** to student teaching placement. Before completing the program, students must not only pass the *Content Specialty Test* (CST) in biology, they must score at least 220 on all sections of the exam. Students with scores lower than 220 on any section of the CST must pass an alternate exam on the concepts of that section administered by the content advisor. The *Assessment of Teaching Skills, Written* (ATS-W) is also required prior to certification. For further information about the NYSTCE program, visit their website at <http://www.nystce.nesinc.com/>.

All students must be fingerprinted while enrolled in SCI 410/510, and complete three mandated seminars, *Training in Child Abuse Recognition*, *Substance Abuse Education*, and *School Violence and Intervention*, prior to student teaching. For details see <http://www.sunysb.edu/spd/career/tworkshops.html>

### **Language Requirement:**

New York State certification requires at least one year (6 credits) of college level study of a foreign language. Satisfaction of SBU's DEC Entry Skill 3 fulfills the foreign language requirement.

### **Professional Portfolio:**

The Professional Portfolio is presented and defended at the conclusion of student teaching. It includes many performance indicators of standards-based teaching competencies.