Becoming an Earth Science Teacher

Three Routes to New York State Certification

Stony Brook University offers three programs registered and approved by the New York State Education Department for individuals seeking New York State certification to teach earth and space sciences in secondary schools, grades 7 – 12.

1. The **undergraduate** route to certification requires completion of a Bachelor of Arts in Earth and Space Sciences/ Science Education track or a double major of a Bachelor of Arts in Earth and Space Sciences/ Science Education track with a Bachelor of Science in Atmospheric and Oceanic Sciences, Astronomy/Planetary Sciences or Geosciences with the Teacher Preparation option. A complete description of this program track can be found on Page 2.
2. The **graduate** route to certification requires completion of the Master of Arts in Teaching Earth Science degree, as well as completion of science course requirements equivalent to the Stony Brook Bachelor of Arts degree in Earth and Space Sciences/Earth Science Education track. A complete description of this program track can be found on Page 5.
3. The **combined** route to certification in which students obtain both the Bachelor of Arts in Earth and Space Sciences/ Science Education track and Master of Arts in Teaching Earth Science degrees in 5 years, i.e., one additional year beyond the bachelor degree alone. A double major with a BA in ESS and BA or BS in another major is not possible in this route. A complete description of this program track can be found on Page 10.

The three Stony Brook programs are aligned with the standards of the National Science Teachers Association (NSTA), the New York State Code of Ethics for Teachers, Interstate New Teacher Assessment and Support Consortium (INTASC), and the National Board for Professional Teacher Standards (NBPTS). Candidates completing these programs are eligible for "approved program" teacher certification through the Campus Teacher Certification Office located in the School of Professional Development (https://www.stonybrook.edu/commcms/spd/)

For advisement on courses towards the Bachelor of Arts in Earth and Space Sciences/ Science Education track contact the Geosciences Director of Undergraduate Studies, Dr. Hanna Nekvasil (Hanna.Nekvasil@stonybrook.edu). For advisement on the graduate route, or on applying to the Undergraduate Earth Science Education Program, or for migration to the graduate portion of the combined route while still working towards the Bachelor of Arts in Earth and Space Sciences/ Science Education track please contact the ESS MAT Program Advisor, Dr. Gregory Henkes at (631) 632-2905 (Gregory.Henkes@stonybrook.edu). For advisement on education courses contact Dr. Keith Sheppard, Science Education Program Director at (631) 632-2989 (Keith.Sheppard@stonybrook.edu) or Dr. Linda Padwa, at (631) 632-9750 (Linda.Padwa@stonybrook.edu).

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Undergraduate route to certification

All students intending to work towards initial certification in Earth Science teaching at the undergraduate level, must major in the Earth and Space Sciences/ Science Education track. (*Note:* This major differs from the standard ESS major and is designated by an "ED" after the major on the major declaration form. Students should declare the major as soon as possible to be eligible for NYS Math and Science Teaching Incentive Scholarships.) In addition to the ESS course requirements, students take education courses through the Undergraduate Earth Science Education Program, which satisfy New York State requirements for initial certification as a secondary school teacher of earth science and general science. The set of pedagogy courses of this program is designed to be taken sequentially in the last three or four semesters of progress towards the Bachelor of Arts in Earth and Space Sciences/ Science Education track.

Students must apply for admission into the Undergraduate Earth Science Education Program while a major in ESS /Science ED track. To do this they must:

- Apply to the program during the second semester of their sophomore year or first semester of junior year.
- Have taken at least 4 science lab courses.
- Achieve a cumulative GPA of 3.0 and a GPA of 3.0 in science courses.
- Contact the Earth Science Education advisor for a transcript review and to plan a course of study.
- Contact one of the education program advisors for an interview.
- Fill out the Teacher Preparation Undergraduate Application Form (see https://www.stonybrook.edu/commcms/dtale/admissions/undergraduate.php). Attach an unofficial copy of your transcript(s) from all colleges and universities that you have attended, three letters of reference (at least two from university faculty) regarding your potential to become a teacher, and your essay. 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 ED/TP to the Registrar. Forms are available at the Registrar's Office, the Undergraduate Earth and Space Sciences advisor's office in the ESS Building, and the Science Education Program Office, Life Sciences 092.

Course requirement details

1A. Science Course Requirements for the **undergraduate** route to certification

B.A. in Earth and Space Sciences/Science Education Track: (effective 2020)

Introductory Science Courses

AMS 102 Elements of Statistics
AST 101 Introduction to Astronomy and AST 112 Astronomy Laboratory
ATM 102 Weather and Climate
ATM 205 Introduction to Atmospheric Sciences
BIO 201 Fundamentals of Biology: Organisms to Ecosystems
BIO 202 Fundamentals of Biology
BIO 204 Fundamental of Scientific Inquiry
CHE 131, 132 General Chemistry I and II (see note #1)
CHE 133, 134 General Chemistry Laboratory I and II
GEO 122 Physical Geology or GEO 102 The Earth and GEO 112 Physical Geology Laboratory
GEO 103 The Earth Through Time and GEO 113 Historical Geology Laboratory
MAT 125 Calculus A
PHY 119 Physics for Environmental Studies or PHY 125/133 or PHY 131/133

Elective Courses
At least 24 credits should be selected, chosen in consultation with the undergraduate program director. At least two of the courses must include a laboratory. There are numerous GEO, ATM, AST, and MAR courses offered that can be used to meet the elective requirements.

Specific Science Concentration
At least 12 credits of the 24 elective credits must be chosen from a single earth and space science discipline: either astronomy, atmospheric sciences, or geosciences.

Upper-division Writing Requirement
The writing requirement can be satisfied by successful completion of GEO 496.

Note:
1. The sequence CHE 129 and 130 may be substituted for CHE 131, with permission of the undergraduate program director.

To qualify for the General Science (7-12) certification, candidates must complete a minimum of 18 semester hours in two or more sciences other than the earth sciences.

1B. Education Course Requirements for the **undergraduate** route to certification

Required Professional Studies
___ PSY 327 Middle Childhood/Adolescent Development
___ SSE 350 Foundations in Education
___ LIN 344 Language Acquisition and Literacy Development
___ CEF 347 Introduction to Special Education
___ 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

1C. 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 in secondary schools prior to student teaching. Each teacher candidate is required to obtain 15 hours of field experience that includes a focus on understanding the needs of students with disabilities. These hours will be noted on the Field Experience Time Sheets from SCI 449, SCI 450, or a combination of both. While earning these field experience hours, teacher candidates will be encouraged to observe inclusion (integrated co-teaching) classes in their certification area and other special education classroom situations as available.
All teacher candidates must be fingerprinted upon entry into SCI 410 before completing any field experiences.

1D. New York State examinations required for teacher certification are:
- **Educating All Students Test** (EAS)
- **Content Specialty Test (CST) in Earth Scienc**e [Note: It is a program requirement that candidates with a score lower than 220 on any sub-section of the CST must pass an alternate exam on the concepts of that section which will be administered by departmental faculty.]

For further information about the NYSTCE testing program, visit their website at http://www.nystce.nesinc.com/.

It is recommended that candidates take the EAS upon completion of PSY 327, CEF 347 and LIN 344, and take the CST upon completion of Earth Science courses required for the major.

1E. Student Teaching
A full semester of student teaching is required. 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. Depending on the semester and public school vacation schedules, student teaching may extend beyond the university semester calendar.

Prior to admission to student teaching, candidates will be interviewed by a committee to assess their ability to speak extemporaneously about both earth science concepts and pedagogical issues. Candidates who are not successful in this interview will be counseled on how 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.

Prior to student teaching, candidates must complete four mandated seminars, *Training in Child Abuse Recognition, Substance Abuse Education, School Violence and Intervention,* and *Dignity for All Students* (DASA). For details and to register for the seminars on campus, see http://www.sunysb.edu/spd/career/tworkshops.html.

1F. 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.

1G. Language Requirement
New York State certification requires six credits of college level study of a foreign language. Satisfaction of SBU's DEC Entry Skill 3/SBC LANG fulfills the foreign language requirement.

Graduate route to certification: MAT Earth Science program

This program is designed as a course of study leading to New York State certification for teaching Earth Science and General Science in the secondary schools (grades 7-12), with an extension option for grades 5-6. This program, offered in collaboration with the School of Professional Development, the University's Department of Geosciences and the Distributed Teacher and Leader Education program (D-TALE), is designed for those who have little or no previous coursework in education or formal classroom teaching experience. The program is committed to both science teaching and science learning.

The graduate academic programs at SUNY Stony Brook for earth science teachers have been designed to provide the education necessary for teaching the Earth Science Curriculum in New York State. In order to teach the curriculum, it is essential that teachers have college level courses in atmospheric science, astronomy, geoscience and marine science. About 60% of the Earth Science Curriculum is geoscience, 20% is atmospheric science, and 20% is astronomy. It is highly recommended that a student preparing for a career as an earth science teacher become familiar with the curriculum and the contents of the New York State Regents Exams in Earth Sciences. Examples of Regent Exam Questions as well as Earth Science Reference Tables can be found at the State Education site.

Admission to MAT Earth Science Education Program

You should first consult with the MAT Earth Science Education advisor to determine if you should proceed with the application process. Earth Science Education Advisor is: Dr. Gregory Henkes (Gregory.Henkes@stonybrook.edu, phone: 631-632-2905).

Requirements
A bachelor's degree with an academic major (or a minimum of 36 credits) in the content field with a minimum GPA of 3.0 in your overall bachelor's degree program and a minimum GPA of 3.00 in science studies. You must also demonstrate, through your application and letters of reference, that you possess the temperament and disposition to be an effective teacher. Most applicants will have little to no previous course work in education or formal classroom teaching experience.

Application
You must submit or have sent to the School of Professional Development

- Completed MAT application with a nonrefundable application fee
- Three letters of recommendation, preferably from faculty who know you well
- Official copies of all previous college transcripts
- Any additional items required by the School of Professional Development

Time to Complete Studies
The MAT program in Earth Science can often be completed in three semesters of full-time study, but it is somewhat longer for the part-time student.

Additional Information

- The earth science education advisor, Dr. Gregory Henkes, provides information about the science requirements. Email: Gregory.Henkes@stonybrook.edu, phone: 631-632-2905.
- The Science Education Program provides information about science education courses. See the I-STEM website for details: <https://www.stonybrook.edu/commcms/istem/students/prospective_teachers/prospective_teachers.php> or contact the Science Education Assistant Director, Dr. Linda Padwa, at 631-632-9750.

2A. Science Course Requirements for MAT route to certification.

These minimum introductory and graduate or advanced undergraduate science course requirements must be met before you begin student teaching.

Introductory Science Courses
The following courses or their equivalents at other colleges or universities are required.

- AMS 102 Elements of Statistics
- AST 101 Introduction to Astronomy and AST 112 Astronomy Laboratory
- ATM 102 Weather and Climate
- ATM 205 Introduction to Atmospheric Sciences
- BIO 201 Fundamentals of Biology: Organisms to Ecosystems
- BIO 202 Fundamentals of Biology
- BIO 204 Fundamental of Scientific Inquiry
- CHE 131, 132. General Chemistry I and II
- CHE 133, 134 General Chemistry Laboratory I and II
- GEO 122 Physical Geology or GEO 102 The Earth and GEO 112 Physical Geology Laboratory
- GEO 103 The Earth Through Time and GEO 113 Historical Geology Laboratory
- MAT 125 Calculus A
- PHY 119 Physics for Environmental Studies or PHY 125/133 or PHY 131/133
  OR PHY 121/123 Physics for Life Sciences with Lab

Graduate or Advanced Undergraduate Science Courses 24 credits total

At least 12 credits across the Earth Sciences: astronomy, atmospheric sciences, and geology. Some marine science courses with an earth science theme are also acceptable. (Note: Graduate atmospheric science courses have an MAR designator.)

At least 12 credits in a single scientific discipline; acceptable disciplines are geology, astronomy, atmospheric science, physics, chemistry, biology, physical geography, or environmental science**.**

Note: Advanced courses are those with a pre-requisite of introductory courses or a sequence of introductory courses. For example, an advanced course in chemistry may require CHE 131 and CHE 132 as prerequisites. However, CHE 132, which requires CHE 131, is not an advanced course. At Stony Brook Univ. most advanced courses are numbered 300 or higher.

Approved Graduate Earth Science Courses

Students will be required to complete 15 credits of approved graduate earth science courses and a research project or projects approved by the sponsoring department. Graduate earth science courses taken as part of the MAT Earth Science curriculum can be used to meet the required 24 credits of advanced earth science for student teaching. A list of appropriate earth science courses can be found in the next section.

At least one of the chosen graduate courses must require a research report that involves selecting or collecting data or observations, processing and interpreting this information and presenting it in a professional style. A report that consists of a literature review is not acceptable to meet this requirement. A lesson plan *in lieu* of a research project is also not acceptable. The research projects are generally associated with the science courses required for this degree. The student must arrange with the instructor and the MAT Earth Science Education advisor before the semester starts, or at the beginning of the semester, about the requirements for these projects. To document that the report requirement has been met, the student must register for the zero-credit course, ESS 600, in the semester that the report is completed.

Graduate Courses are selected with the approval of the earth science advisor. The selection should include recognition of the minimum course requirements for student teaching described above. The approved graduate courses for the MAT include the following.

ESS 501 Foundations of Earth Science
ESS 522 The Planets*
ESS 523 Collisions in the Solar System*
ESS 524 The Universe*
ESS 532 Atmospheric Fundamentals*
ESS 533 Global Climate*
ESS 534 Air Pollution and Control*
ESS 536 Principles of Weather Analysis and Forecasting*
ESS 541 Earth's Surficial Environment*
ESS 542 Tectonic Environment*
ESS 543 Rocks and Minerals*
ESS 544 Geology of New York*
ESS 585 Directed Studies
ESS 589 Research for Earth Science Teachers (1 to 3 credits)*+
ESS 601 Topics in Earth and Space Sciences
GEO 510 Dimensions of Global Change*
GEO 513 GIS Fundamentals I*
GEO 520 Glacial Geology
GEO 530 The Geology of Mars*
GEO 533 Geochemistry of the Terrestrial Planets*
GEO 535 Regional Structure and Tectonics*
GEO 543 Stratigraphy*/ GEO 563 Stratigraphy Laboratory
GEO 547 Remote Sensing in Geosciences*
GEO 549 Structural Geology*/ GEO 569 Structural Geology Laboratory
GEO 567 Sedimentary Rocks and Crustal Evolution*
GEO 585 Directed Studies
GEO 588 Geological Field Methods for Earth Science Teachers*
MAR 506 Geological Oceanography*
MAR 527 Global Change*
MAR 564 Atmospheric Structure and Analysis *
MAR 565 Global Atmospheric Change*
MAR 566 Air Pollution and Its Control*
MAR 596 Principles of Atmospheric Chemistry*
*Science research project typically required as part of course.
+ A student with a strong background in one of the earth sciences may choose to do an independent research project for credit by registering for ESS 589 for between 1 and 3 credits. This must be done in consultation with a faculty research mentor who commits to advising the student.

Transferring Credits to the MAT Program
Students may wish to begin taking graduate classes before applying for the MAT Earth Science program as non-matriculated students with the School of Professional Development.

- Up to 12 credits of graduate courses can be transferred from a non-matriculated status or from another major
- Up to 6 credits of science graduate courses from another university can be transferred.

- All courses to be transferred have to be approved by the Earth Science Education advisor and the School of Professional Development.

2B. Required Science Education Courses

Professional Studies in Education 21 credits

- CEE 505 Education: Theory and Practice
- CEE 565 Human Development
- CEE 594 Language Acquisition and Literacy Development
- CEF 547 Principles and Practices of Special Education
- SCI 510 Pedagogy and Methods in Science Education I
- SCI 520 Pedagogy and Methods in Science Education II
- SCI 549 Field Experience I
- SCI 550 Field Experience II

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 in secondary schools prior to student teaching. Each teacher candidate is required to obtain 15 hours of field experience that includes a focus on understanding the needs of students with disabilities. These hours will be noted on the Field Experience Time Sheets from SCI 549, SCI 550, or a combination of both. While earning these field experience hours, teacher candidates will be encouraged to observe inclusion (integrated co-teaching) classes in their certification area and other special education classroom situations as available.

2C. Mandated Seminars and Fingerprinting

- All teacher candidates must be fingerprinted at the start of SCI 510 and before beginning field observations.
- Prior to student teaching, candidates must complete four mandated seminars, *Training in Child Abuse Recognition, Substance Abuse Education, School Violence and Intervention,* and *Dignity for All Students* (DASA). For details and to register for the seminars on campus, see http://www.sunysb.edu/spd/career/tworkshops.html.

2D. New York State examinations required for teacher certification are:

- **Educating All Students Test** (EAS)
- **Content Specialty Test (CST) in Earth Science** [Note: It is a program requirement that candidates with a score lower than 220 on any sub-section of the CST must pass an alternate exam on the concepts of that section which will be administered by departmental faculty.]
- For further information about the NYSTCE testing program, visit their website at http://www.nystce.nesinc.com/.

It is recommended that candidates take the EAS upon completion of CEE 565, CEF 547 and CEE 594, and take the CST during SCI 510.

2E. Supervised Student Teaching 9 credits

A full semester of student teaching is required. 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. Dependent on the semester and public school vacation schedules, student teaching may extend beyond the university semester calendar.

Prior to admission to student teaching, candidates will be interviewed by a committee to assess the ability to speak extemporaneously about both earth science concepts and pedagogical issues. Candidates who are not successful in this interview will be counseled on how 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.

- SCI 551 Supervised Student Teaching High School Grades 10-12
  (co requisite SCI 552 & SCI 554)
- SCI 552 Supervised Student Teaching Middle School Grades 7-9
  (co requisite SCI 551 & SCI 554)
- SCI 554 Student Teaching Seminar (co requisite SCI 551 & SCI 552)

2F. Language Requirement:
New York State certification requires 6 credits of a foreign language or its equivalent. (Satisfaction of SBU's DEC Entry Skill 3/SBC LANG fulfills this requirement.) Bilingual students may satisfy this requirement by taking the CLEP exam in foreign language.
(http://www.collegeboard.com/student/testing/clep/ex_foreign.html)

2G. 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.

2H. Middle Level Extension
Candidates who wish to qualify to teach grades 5 and 6 in a middle school setting may obtain an extension to their grades 7-12 certification by completing two additional courses prior to graduation. The courses are: CEE 601 Early Adolescent Development and CEE 602 Middle Child Education-Instruction. More information about these courses can be found on the SPD website (www.stonybrook.edu/spd).

2I. General Science Certification
To qualify for the General Science (7-12) certification, candidates must complete a minimum of 18 semester hours (undergraduate or graduate level) in two or more sciences other than the earth sciences.

Five-Year BA/MAT Earth Science Teacher Preparation Program: Degree and Certification Requirements

This program is designed as a course of study leading to New York State certification for teaching Earth Science and General Science in the secondary schools (grades 7-12), with an extension option for grades 5-6. This program, offered in collaboration with the School of Professional Development, the University's Department of Geosciences and the Distributed Teacher and Leader Education program (D-TALE), is designed for those who have little or no previous coursework in education or formal classroom teaching experience. The program is committed to both science teaching and science learning.

The requirements for the combined BA/MAT program in Earth Science Education are identical to the requirements for the two programs separately. Time is saved by allowing some courses in science content and pedagogy to count for both degrees.

Students should apply to the combined BA/MAT program during their fifth or sixth semester of study towards the B.A. in ESS/Science Education track. (Note: Students should declare the undergraduate major as soon as possible to be eligible for NYS Math and Science Teaching Incentive Scholarships. This declaration requires adding TP/ED to the ESS major title on the major declaration form.)
Once accepted into the program, 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 advance to Graduate status upon completion of their 15th graduate credit, typically during their eighth or ninth semester.

Applicants to the BA/MAT Earth Science Teacher Preparation Program must:

- Have taken at least 4 science lab courses.
- Contact the earth science education advisor 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 by the end of junior year.
- Complete the BA/MAT application that is found on the web site (https://www.stonybrook.edu/commcms/spd/graduate/ba_mat.php).
    - SPD Student Application/Information Sheet
    - Three (3) letters of recommendation
    - Official transcript from each college or university attended
    - Application Essay
    - Any additional items required by the School of Professional Development
- Submit application prior to SPD deadline as indicated on the SPD website.

NOTE: Upon acceptance 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 Earth Science advisor's office in the Earth Sciences Building, and the Science Education Program Office, Life Sciences 061.

The science advisor for the undergraduate portion of this program (BA in Earth and Space Sciences, Education Track) is Prof. Hanna Nekvasil (hanna.nekvasil@stonybrook.edu). The science advisor for the graduate portion of this program is Prof. Gregory Henkes (Gregory.Henkes@stonybrook.edu).

3A. Undergraduate and Graduate credits required

Undergraduate*:* 45 credits of SBC and free electives; 12 Credits of Advanced Earth Science courses to be chosen in consultation with the BA in ESS ED advisor

Graduate: 15 Credits of Earth Science Courses to be chosen in consultation with the Earth Science Education advisor. ***These credits may also count towards the upper-division credit requirements for courses in Earth Sciences needed for the ESS B.A.***

Students must maintain a B average in their graduate courses. Students who are unable to maintain this average will be encouraged, while in Semester 8 of their studies, to leave the program and graduate with a BA degree in Earth and Space Science.

3B. Graduate writing requirement:

At least one of the graduate courses must require a research report that involves selecting or collecting data or observations, processing and interpreting this information and presenting it in a professional style. A report that consists of a literature review or lesson plan will not meet this requirement. To document that the report requirement has been met, the student must register for the zero-credit course, ESS 600, in the semester that the report is completed.

3C. 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 in secondary schools prior to student teaching. Each teacher candidate is required to obtain 15 hours of field experience that includes a focus on understanding the needs of students with disabilities. These hours will be noted on the Field Experience Time Sheets from SCI 549, SCI 550, or a combination of both. While earning these field experience hours, teacher candidates will be encouraged to observe inclusion (integrated co-teaching) classes in their certification area and other special education classroom situations as available.

3D. Additional requirements.

- All teacher candidates must be fingerprinted during SCI 510, prior to starting field observations.
- Prior to student teaching, candidates must complete four mandated seminars, *Training in Child Abuse Recognition, Substance Abuse Education, School Violence and Intervention,* and *Dignity for All Students* (DASA). For details and to register for the seminars on campus, see http://www.sunysb.edu/spd/career/tworkshops.html.

3E. State Tests

New York State examinations required for teacher certification are:

- **Educating All Students Test** (EAS)
- **Content Specialty Test** (CST) in Earth Science [Note: It is a program requirement that candidates with a score lower than 220 on any sub-section of the CST must pass an alternate exam on the concepts of that section which will be administered by departmental faculty.]
- For further information about the NYSTCE testing program, visit their website at http://www.nystce.nesinc.com/.

It is recommended that candidates take the EAS upon completion of PSY 327/CEE 565, CEF 347/547 and LIN 344/CEE 594, and take the CST during SCI 510.

3F. Student teaching

Prior to admission to Student Teaching, the candidate will be interviewed by a committee consisting of the content advisor, a member of the science education faculty, and the student teaching field supervisor. The purpose of this interview is to assess the candidate's ability to speak extemporaneously about subject matter 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 be blocked from student teaching.

3G. Language Requirement:

New York State certification requires at least six credits of college level study of a foreign language. Satisfaction of SBU's DEC Entry Skill 3/SBC LANG fulfills the foreign language requirement.

3H. Professional Portfolio:

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

3I. General Science Certification:

To qualify for the General Science (7-12) certification, candidates must complete a minimum of 18 semester hours in two or more sciences other than the earth sciences.

3J. Middle Level Extension:

Candidates who wish to qualify to teach grades 5 and 6 in a middle school setting may obtain an extension to their grades 7-12 certification by completing two additional courses prior to graduation. The courses are: CEE 601 Early Adolescent Development and CEE 602 Middle Child Education-Instruction. More information about these courses can be found on the SPD website (www.stonybrook.edu/spd).

Note: The two degrees (B.A. in ESS/Science Education track and the MAT) 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 BA in Earth and Space Sciences.

Science Course Requirements- Details

These minimum introductory and graduate or advanced undergraduate science course requirements must be met before you begin student teaching.

A. Introductory Science Courses

The following courses or their equivalents at other colleges or universities are required.

- AMS 102 Elements of Statistics
- AST 101 Introduction to Astronomy and AST 112 Astronomy Laboratory
- ATM 102 Weather and Climate
- ATM 205 Introduction to Atmospheric Sciences
- BIO 201 Fundamentals of Biology: Organisms to Ecosystems
- BIO 202 Fundamentals of Biology
- BIO 204 Fundamental of Scientific Inquiry
- CHE 131, 132. General Chemistry I and II (see note #2)
- CHE 133, 134 General Chemistry Laboratory I and II
- GEO 122 Physical Geology or GEO 102 The Earth and GEO 112 Physical Geology Laboratory
- GEO 103 The Earth Through Time and GEO 113 Historical Geology Laboratory
- MAT 125 Calculus A
- PHY 119 Physics for Environmental Studies or PHY 125/133 or PHY 131/133

B. **Graduate or Advanced Undergraduate Science Courses** 27 credits

(Note: Advanced courses are those with a pre-requisite of introductory courses or a sequence of introductory courses. For example, an advanced course in chemistry may require CHE 131 and CHE 132

as prerequisites. However, CHE 132, which requires CHE 131, is not an advanced course. At Stony Brook most advanced courses are numbered 300 or higher.)

At least 15 Credits across the Earth Science disciplines, astronomy, atmospheric sciences, and geology. Some marine science courses with an earth science theme are also acceptable. Graduate atmospheric science courses have an MAR designator.

At least 12 credits in one scientific discipline; acceptable disciplines are geology, astronomy, atmospheric science, physics, chemistry, biology, physical geography, or environmental science. Students selecting geology should take GEO306/366, GEO407/467 ***before*** entering the program.
Courses are selected with the approval of the earth science advisor. The selection should include recognition of the minimum course requirements for student teaching above.

15 credits of graduate courses can count towards the university's undergraduate upper-level credit requirement. However, these courses cannot be used to substitute for any fundamental course in **A.** above. Students selecting geology as a discipline should take GEO 543 Stratigraphy*/ GEO 563 Stratigraphy Laboratory and GEO 549 Structural Geology*/ GEO 569 Structural Geology Laboratory or the undergraduate equivalents, GEO403/463 and GEO309/369.

The approved graduate courses for the MAT include the following:

ESS 501 Foundations of Earth Science
ESS 522 The Planets*
ESS 523 Collisions in the Solar System*
ESS 524 The Universe*
ESS 532 Atmospheric Fundamentals*
ESS 533 Global Climate*
ESS 534 Air Pollution and Control*
ESS 536 Principles of Weather Analysis and Forecasting*
ESS 541 Earth's Surficial Environment*
ESS 542 Tectonic Environment*
ESS 543 Rocks and Minerals*
ESS 544 Geology of New York*
ESS 585 Directed Studies
ESS 589 Research for Earth Science Teachers (1 to 3 credits)*+
ESS 601 Topics in Earth and Space Sciences
GEO 510 Dimensions of Global Change*
GEO 513 GIS Fundamentals I*
GEO 520 Glacial Geology
GEO 530 The Geology of Mars*
GEO 533 Geochemistry of the Terrestrial Planets*
GEO 535 Regional Structure and Tectonics*
GEO 543 Stratigraphy*/ GEO 563 Stratigraphy Laboratory
GEO 547 Remote Sensing in Geosciences*
GEO 549 Structural Geology*/ GEO 569 Structural Geology Laboratory
GEO 567 Sedimentary Rocks and Crustal Evolution*
GEO 585 Directed Studies
GEO 588 Geological Field Methods for Earth Science Teachers*
MAR 506 Geological Oceanography*
MAR 527 Global Change*
MAR 564 Atmospheric Structure and Analysis *
MAR 565 Global Atmospheric Change*
MAR 566 Air Pollution and Its Control*

MAR 596 Principles of Atmospheric Chemistry*
* Science research project required as part of course.
+ A student with a strong background in one of the earth sciences may choose to do an independent research project for credit by registering for ESS 589 for between 1 and 3 credits. This must be done in consultation with a faculty research mentor who commits to advising the student.

A student wishing to complete this 5-year combined program is strongly encouraged to consult with the earth science teacher preparation advisor (Dr. Gregory Henkes) for individualized guidance in course selection.

Sample Course Sequence for Combined BA-MAT Program

	UG	G		UG	G
Semester 1			**Semester 6**		
SBC	3		ATM 205	3	
CHE 131	4		SBC	3	
CHE 133	1		UG Earth Science	4	
GEO 102/112	3+1		Upper Division SBC	3	
or GEO 122	4		Upper Division Elec.	3	
MAT 125	3		Upper Division Elec.	3	
Semester 2			**Semester 7**		
SBC	3		SBC	3	
BIO 201 or BIO 202	3		SBC	3	
CHE 132	4		UG Earth Science	4	
CHE 134	1		PSY 327	3	
GEO 306	3		LIN 344	3	
GEO 366	1		**Semester 8**		
Semester 3			SBC	3	
SBC	3		Grad Earth Science		3
SBC	3		Grad Earth Science		3
GEO 407/467	4		Grad Earth Science		3
BIO 202 or BIO 201	3		SCI 510		3
BIO 204	2		SCI 549		1
Semester 4			**Semester 9**		
PHY 119	3		CEE 505		3
SBC	3		Grad Earth Science		3
AST 101	3		Grad Earth Science		3
AST 112	1		SCI 520		3
AMS 102	3		SCI 550		1
SBC	3		CEF 547		3
Semester 5					
GEO 103	3		**Semester 10**		
GEO 113	1		SCI 551		3
ATM 102	3		SCI 552		3
Upper Division SBC	3		SCI 554		3
Upper Division Elec.	3				
Upper Division Elec.	3				

The above listing of courses provides a *suggested* sequence for coursework. There is a degree of flexibility in the order of courses, so the earth science teacher preparation advisor (Dr. Henkes) should be consulted when planning a course sequence.