

General information about
**ED.M. CERTIFICATION PROGRAMS IN PHYSICAL SCIENCE EDUCATION AND
BIOLOGICAL SCIENCE EDUCATION**
(for post-baccalaureate students—**Revised 1/02**)

Rutgers Graduate School of Education offers two programs for prospective high school science teachers: in physical science education (prepares to teach physics and chemistry) and in biological science education (prepares to teach high school biology). Each program has professional courses that prepare students to teach their respective subjects and general education courses that help them understand how people learn in diverse educational settings. There are six methods courses in each field of study – an unprecedented number for the teacher preparation program. . The emphasis of the programs is on inquiry, modern science, and technology. An extensive clinical practice is a part of preparation future physics/chemistry and biology teachers. Students observe science lessons in high schools and model science instruction in informal settings, work with middle and high school teachers in neighboring schools, serve as instructors in the physics and chemistry departments and student teach for one semester. The information about each program is provided separately. Please note that there are two sets of requirements: liberal arts courses and science content courses. Make sure you satisfy (or almost satisfy) both before you apply. If you have questions regarding the program e-mail the coordinator of the program

Associate Professor Eugenia Etkina at etkina@rci.rutgers.edu.

Physical Science Education Program

I. PROGRAM DESCRIPTION

The master's degree/certification programs in Physical Science Education is designed for individuals who possess a baccalaureate degree from an accredited institution of higher education and who wish to pursue certification and a masters degree in physical science education at the same time. Certificates are recommended only in conjunction with the completion of the requirements for the Ed.M. degree.

The program has four major goals:

1. To help students learn pedagogical content knowledge of physical science, i.e. content specific teaching methods in physics/chemistry.
2. To provide students with a grounding in the historical and philosophical contexts of the discipline that they will be certified to teach, i.e. history and philosophy of physical science.
3. To provide students with research experiences in physical science. This will help them better understand how scientists work and how discipline-specific knowledge develops.
4. To provide students with the knowledge and skills of integrating technology into physical science instruction.

II. LIBERAL ARTS REQUIREMENTS¹

A. General Education. Prior to beginning or completing the program, the student must have completed, at either the graduate or undergraduate level, coursework in 8 of the following 11 areas:

- Mathematics²
- Science
- English Literature or American Literature
- American History or American Studies
- Non-Western studies (or any course dealing with cross-cultural perspectives or diversity, etc.)
- Western History
- Art History or Music
- Philosophy
- Technology
- Foreign language (four semesters)
- Psychology (not including educational psychology)

B. Before teacher certification can be recommended, the student must have completed a major or 30 credits in a physical science (physics, or chemistry). The courses should be distributed evenly between different fields within the discipline. Physics majors should complete coursework in mechanics, electricity and magnetism, thermodynamics, optics, atomic and nuclear physics. Chemistry majors should complete work in organic and non-organic chemistry, physical chemistry, and quantum chemistry. At least 12 credits in one physical science must be taken at the 300 or 400 level. The final decision on the appropriateness of physics/chemistry credits is made by the advisor.

III. PROFESSIONAL EDUCATION PROGRAM REQUIREMENTS

¹ The total of 96 liberal arts credits must be completed before teacher certification can be recommended.

² A college level math course is required for teacher certification.

SCIENCE EDUCATION..... 21 credits

15:256:551	Development of Ideas in Physical Science (3)
05:300:462	Demonstration and Technology in Science Education (3)
15:256:555	Research Internship in X-ray astronomy(3)
15:256:552	Teaching Physical Science* (3)
15:256:557	Multiple Representations in Physical Science (3)
Grad Level	Electives (Physics/chemistry course selection must be approved by advisor) (6)

COMMON PROFESSIONAL EDUCATION CORE.....12 credits

05:300:401	Individual and Cultural Diversity (3)
05:300:306	Educational Psychology (3)
15:255:533	Assessment and Measurement for Teachers (2)
15:255:534	Classroom Organization (1)
15:255:537	Education, Ethics, and Society (3)

INTERNSHIP IN TEACHING..... 12 credits

15:255:535	Internship in Teaching* (9)
15:255:536	Internship Seminar (3)

TOTAL: 45
CREDITS

* **Field work associated with this course.**

IV. **PRAXIS II.** Students seeking certification in the **physical sciences** are required to take Chemistry: Content Knowledge (**Test Code 20241**), Physics: Content Knowledge (**Test Code 10261**), and General Science: Content Knowledge, Part 1 (**Test Code 10431**). Students may take these tests during November or March

V. **COMPREHENSIVE EXAMINATION.** No comprehensive examination is required.

FACULTY

Associate Professor Eugenia Etkina (732-932-7496 Ext. 8339)

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Course sequence

FALL 1:

15:256:551	Development of Ideas in Physical Science (3)
05:300:401	Individual and Cultural Diversity (3)
05:300:306	Educational Psychology (3)

SPRING 1:

15:256:553	Teaching Physical Science* (3)
05:300:462	Demonstration and Technology in Science Education (3)
	Physics/chemistry Grad Level Elective (selection must be approved by advisor) (3)

SUMMER:

15:255:533	Assessment and Measurement for Teachers (2)
15:256:555	Research Internship in x-ray astronomy (3)

FALL 2:

15:255:534	Classroom Organization (1)
15:255:535	Internship in Teaching** (9)
15:255:536	Internship Seminar (3)

SPRING 2:

15:256:557	Multiple Representations in Physical Science (3)
15:255:537	Education, Ethics, and Society (3)

* In Fall 1, Summer, and Spring 2, students may take an elective or a course to help them meet the general education or major requirements.

** Field work associated with this course.

Biological Science Education Program

I. PROGRAM DESCRIPTION

The master's degree/certification programs in Biological Science Education is designed for individuals who possess a baccalaureate degree from an accredited institution of higher education and who wish to pursue certification and a masters degree in biological science education at the same time. Certificates are recommended only in conjunction with the completion of the requirements for the Ed.M. degree.

The program has four major goals:

1. To help students learn pedagogical content knowledge of biological sciences, i.e. content specific teaching methods in biology.
2. To provide students with a grounding in the historical and philosophical contexts of the discipline that they will be certified to teach, i.e. history and philosophy of life sciences.
3. To provide students with research experiences in biology. This will help them better understand how scientists work and how discipline-specific knowledge develops.
4. To provide students with the knowledge and skills of integrating technology into biological science instruction.

II. LIBERAL ARTS REQUIREMENTS³

5. General Education. Prior to beginning or completing the program, the student must have completed, at either the graduate or undergraduate level, coursework in 8 of the following 11 areas:

- Mathematics⁴
- Science
- English Literature or American Literature
- American History or American Studies
- Non-Western studies (or any course dealing with cross-cultural perspectives or diversity, etc.)
- Western History
- Art History or Music
- Philosophy
- Technology
- Foreign language (four semesters)
- Psychology (not including educational psychology)

B. Biological Science Specialization. Before teacher certification can be recommended, the student must have completed a major or 30 credits in a biological science (biology, zoology, botany, physiology). The course work

³ The total of 96 liberal arts credits must be completed before teacher certification can be recommended.

⁴ A college level math course is required for teacher certification.

should be distributed between zoology, botany, physiology, microbiology and genetics. At least 12 credits in one biological science must be taken at the 300 or 400 level. The final decision on the appropriateness of physics/chemistry credits is made by the advisor.

III. PROFESSIONAL EDUCATION PROGRAM REQUIREMENTS

SCIENCE EDUCATION.....21 credits

15:256:550	Biology & Society (3)
05:300:462	Demonstration and Technology in Science Education (3)
15:256:555	Research Internship in Science Education (3)
15:256:553	Teaching Life Science* (3)
15:256:556	Understanding Evolution (3)
Grad Level	Electives (Life Science Course selection must be approved by advisor) (6)

COMMON PROFESSIONAL EDUCATIONCORE.....12 credits

05:300:401	Individual and Cultural Diversity (3)
05:300:306	Educational Psychology (3)
15:255:533	Assessment and Measurement for Teachers (2)
15:255:534	Classroom Organization (1)
15:255:537	Education, Ethics, and Society (3)

INTERNSHIP IN TEACHING.....12 credits

15:255:535	Internship in Teaching (9)
15:255:536	Internship Seminar (3)

TOTAL: 45
CREDITS

* Field work associated with this course.

PRAXIS II. Students seeking certification in the **biological sciences** are required to take Biology: Content Knowledge, Part 2 (**Test Code 20232**), General Science: Content Knowledge, Part 1 (**Test Code 10431**), and General Science: Content Knowledge, Part 2 (**Test Code 10432**).

VI. **COMPREHENSIVE EXAMINATION.** No comprehensive examination is required.

FACULTY

Associate Professor Eugenia Etkina (732-932-7496 Ext. 8339)

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Course sequence

FALL 1:

15:256:550	Biology & Society (3)
05:300:401	Individual and Cultural Diversity (3)
05:300:306	Educational Psychology (3)

SPRING 1:

05:300:462	Demonstration and Technology in Science Education (3)
15:256:552	Teaching Life Sciences**(3)
	Grad Level biology Elective (selection must be approved by advisor) (3)

SUMMER:

15:255:533	Assessment and Measurement for Teachers (2)
15:256:555	Research Internship in biology (3)

FALL 2:

15:255:534	Classroom Organization (1)
15:255:535	Internship in Teaching (9)**
15:255:536	Internship Seminar (3)

SPRING 2:

15:255:537	Education, Ethics, and Society (3)
15:256:556	Understanding Evolution (3)

* In Fall 1, Summer, and Spring 2, students may take an elective or a course to help them meet the general education or major requirements.

** Field work associated with this course.