

# GWTEACH PROGRAM AND THE STEM TEACHING MINOR

## GWTeach

The GWTeach program is designed for undergraduate science, technology, engineering, and mathematics (STEM) majors interested in exploring careers in teaching. The GW initiative, which is based on the nationally recognized UTeach (<http://www.uteach-institute.org>) program, integrates secondary school teacher preparation into the student's major studies.

GW undergraduate students participate in GWTeach by completing all requirements for their STEM major as well as 27 credits in prescribed GWTeach course work. Upon graduation, students who have completed GWTeach requirements are eligible for licensure by the District of Columbia as middle or high school teachers.

The first two courses in the program, GTCH 1001 GWTeach Step 1: Inquiry Approaches to Teaching and GTCH 1002 GWTeach Step 2: Inquiry-based Lesson Design, are open to all mathematics, science, and engineering majors, including pre-med students. In these 1-credit courses, students are exposed to the teaching experience with no obligation to continue in the program. Students who wish to complete the program work with their departmental advisor and the GWTeach advisor to integrate the remaining GWTeach courses with their STEM major program of study.

Students are encouraged to begin the GWTeach program as freshmen, but no later than their sophomore year. Visit the GWTeach Program (<http://gwteach.gwu.edu>) website for additional information.

## The STEM Teaching Minor

The minor in STEM teaching is designed for students majoring in a STEM field who have not yet committed to a career in secondary school teaching. The 18-credit program comprises core courses from GWTeach disciplines and a choice of elective courses.

The STEM teaching minor program is open to students in the GWTeach program and to other students who wish to document the successful learning of ideas and methods in the program's core courses. Students must have permission of the GWTeach Director in order to pursue the minor program.

## STEM TEACHING MINOR

The following requirements must be fulfilled for the STEM teaching minor: 18 credits, including 11 credits in required courses and 7 credits in elective courses.

An 8-credit, two-course sequence or 8 credits in equivalent courses approved by the GWTeach advisor must be completed before beginning the minor program.

| Code  | Title  | Credits |
|---|--|---------|
| <b>Prerequisite</b>   |  |         |
| One of the following 8-credit sequences or approved equivalent courses: |  |         |
| BISC 1115 & BISC 1125   | Introductory Biology: Cells and Molecules and Introduction to Cells and Molecules Laboratory*            |         |
| BISC 1116 & BISC 1126   | Introductory Biology: The Biology of Organisms and Introduction to Organisms Laboratory                  |         |
| or  |  |         |
| CHEM 1111 & CHEM 1112   | General Chemistry I and General Chemistry II   |         |
| or  |  |         |
| PHYS 1011 & PHYS 1012   | General Physics I and General Physics II   |         |
| or  |  |         |
| PHYS 1021 & PHYS 1022   | University Physics I and University Physics II   |         |
| or  |  |         |
| PHYS 1025 & PHYS 1026   | University Physics I with Biological Applications and University Physics II with Biological Applications |         |
| <b>Required</b>   |  |         |
| GTCH 1001   | GWTeach Step 1: Inquiry Approaches to Teaching   |         |
| GTCH 1002   | GWTeach Step 2: Inquiry-Based Lesson Design  |         |
| GTCH 3101   | Knowing and Learning in Mathematics and Science  |         |
| GTCH 3102   | Classroom Interactions   |         |
| GTCH 3103   | Project-Based Instruction  |         |
| <b>Electives</b>  |  |         |
| A minimum of 7 credits from the following courses:                      |  |         |
| GTCH 3201   | Perspectives on Math and Science   |         |
| GTCH 3202   | Research Methods in Math and Science   |         |
| GTCH 3203   | Functions and Modeling   |         |

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| GTCH 3500 | Topics in STEM Teaching |
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| GTCH 3600 | Pedagogy for Learning Assistants |
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\*Honors Program students and those who have been invited to join the Scholars in Quantitative and Natural Sciences (SQNS) Program take BISC 1120 instead of BISC 1125 for the lab component.

## FACULTY

## COURSES

### Explanation of Course Numbers

- Courses in the 1000s are primarily introductory undergraduate courses
- Those in the 2000s to 4000s are upper-division undergraduate courses that can also be taken for graduate credit with permission and additional work
- Those in the 6000s and 8000s are for master's, doctoral, and professional-level students
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office

#### **GTCH 1001. GWTeach Step 1: Inquiry Approaches to Teaching. 1 Credit.**

First recruitment course in the GWTeach professional development sequence. Overview of latest methods in teaching. Elementary school teaching experience using lessons written based on district curricula.

#### **GTCH 1002. GWTeach Step 2: Inquiry-based Lesson Design. 1 Credit.**

Second recruitment course in the GWTeach professional development sequence. Overview of latest methods in teaching. Middle school teaching experience using lessons written based on district curricula. Prerequisite: GTCH 1001.

#### **GTCH 3101. Knowing and Learning in Mathematics and Science. 3 Credits.**

Introduction to models of knowing and learning for classroom practice. Focus on secondary mathematics and science. Restricted to Sophomore or higher standing. Restricted to GWTeach students and to others with permission of the instructor. Prerequisites: GWTeach courses GTCH 1001 - Step 1 and GTCH 1002 - Step 2 or permission of the instructor. Recommended background: Most students will be in the GWTeach program. Other students may enroll with permission of the instructor.

#### **GTCH 3102. Classroom Interactions. 3 Credits.**

Introduction to use of curriculum and technology in the classroom for effective teaching of mathematics, science, and engineering. Interplay between teachers, students, content, and the world beyond schools. Design and implementation of instructional activities. Evaluation of outcomes of instructional activities. Restricted to Junior or Senior standing. Restricted to GWTeach students and to others with permission of the instructor. Prerequisites: GWTeach courses GTCH 1001 - Step 1, GTCH 1002 - Step 2, GTCH 3101 or permission of the instructor. Recommended background: Most students will be in the GWTeach program. Other students may enroll with permission of the instructor.

#### **GTCH 3103. Project-Based Instruction. 3 Credits.**

Design of full units of connected lessons. Integration of mathematics and science content. Intensive field-based experiences. Restricted to students in the GWTeach program with junior or senior standing or with permission of the instructor. Prerequisite: GTCH 3102.

#### **GTCH 3201. Perspectives on Math and Science. 3 Credits.**

Topics and episodes in the history of science and mathematics. Focus on processes by which math and science evolves. Perspectives include biology, physics, geology, astronomy, and chemistry. Historical perspectives on the content and direction of the sciences. Restricted to GWTeach students and to others with permission of the instructor. Restricted to Sophomore or higher standing. Prerequisites: GWTeach courses GTCH 1001 - Step 1 and GTCH 1002 - Step 2 or permission of the instructor. Recommended background: Most students will be in the GWTeach program. Other students may enroll with permission of the instructor.

#### **GTCH 3202. Research Methods in Math and Science. 3 Credits.**

Design experiments to answer scientific questions and reduce systematic and random errors. Statistics to interpret experimental results. Restricted to Sophomore or higher standing. Restricted to GWTeach students and to others with permission of the instructor. Prerequisites: GWTeach courses GTCH 1001 - Step 1 and GTCH 1002 - Step 2 or permission of the instructor. Recommended background: Most students will be in the GWTeach program. Other students may enroll with permission of the instructor.

#### **GTCH 3203. Functions and Modeling. 3 Credits.**

Mathematics addressing unique needs of future teachers of mathematics. Explore models using linear, exponential, polynomial, and trigonometric functions. Restricted to Sophomore or higher standing. Restricted to GWTeach mathematics students and to others with permission of the instructor. Prerequisites: GWTeach courses GTCH 1001 - Step 1 and GTCH 1002 - Step 2 or permission of the instructor. Recommended background: Most students will be in the GWTeach program. Other students may enroll with permission of the instructor.

**GTCH 3500. Topics in STEM Teaching. 1 Credit.**

Issues in STEM research and education. Topics vary by semester. May be repeated for credit if topic differs. Consult the Schedule of Classes for more details. Restricted to GWTeach and minor in STEM teaching students with permission of the GWTeach Associate Director.

**GTCH 3600. Pedagogy for Learning Assistants. 2 Credits.**

Integration of educational theory, pedagogy, and practice; classroom discourse, group discussions, disciplinary thinking, questioning, models of cognition, metacognition, formative assessment, classroom presence. For students serving as learning assistants in large-enrollment undergraduate science courses. Restricted to GWTeach and minor in STEM teaching students with permission of the GWTeach Associate Director.

**GTCH 4000. Apprentice Teaching. 0-7 Credits.**

Culminating experience and tools for first teaching positions. Students who intend to teach mathematics take GTCH 3203 in addition to the listed prerequisites. Restricted to GWTeach apprentice teachers with junior or senior standing. Prerequisites: GTCH 3101, GTCH 3201, and GTCH 3202.