Invitation to Participate

ECS4Alabama: Cohort III Recruitment

Deadline: March 29, 2019

Please contact us if you need additional time.

Tuskegee University, the University of Alabama, and Auburn University, along with other stakeholders (e.g., A+ College Ready and the Alabama State Department of Education), are collaborating on a National Science Foundation (NSF) grant to establish the course "Exploring Computer Science" (ECS) in Alabama high schools. ECS is being taught at schools across the United States and is part of the "CSforAll" initiative, which is a call for action to bring rigorous Computer Science to K-12 schools. ECS was developed initially by educators and researchers at UCLA to help the Los Angeles Unified School District with enhancing Computer Science offerings in LA schools. UCLA is a partner on this project and will be visiting us during the teacher Professional Development activities.

During this current Cohort III recruitment period, we are seeking 8 high schools to join the project for the 2019-20 school year. The $1M project, called *ECS4Alabama*, provides year-long Professional Development (both virtual and face-to-face), a supportive stipend directly to teachers, mentoring and support from Teacher Leaders, and a supplies fund for teachers to buy resources needed for the course. The earlier two Cohorts consist of 54 high school teachers who were recruited over the last two years. After receiving preparation for ECS instruction at Tuskegee University, these teachers are now teaching the course to over 1,000 students in Alabama high schools! It is the first time that these schools are offering a genuine Computer Science course, thus providing access to an important STEM field to a diverse group of students. Close to 50% of these students are young women and 80% are minority.

Computer Science is the college major that consistently has the most number of job offers and one of the highest starting salaries. By 2020, it is projected by the Bureau of Labor Statistics to be the area with most job demand. Yet, true Computer Science (not just computer literacy, such as learning Microsoft Office applications) is very rarely taught in most schools. This new course will introduce authentic Computer Science to more Alabama students! *Governor Ivey has set a goal for having at least one Computer Science course in every Alabama high school by 2022*. This training will help your school to meet that goal. This document contains the following sections:

I. Program Description
II. Applicant Signatures
III. Applicant Information (brief description of the school & contact information for key individuals)
IV. Teacher Section (to be completed by Computer Science Teacher or prospective Computer Science Teacher who will be offering this course)
V. School Section (to be completed by school Principal)
VI. Submission information

Attachments:

- **Attachment A: Teacher Expectations and Incentives Summary**
- **Attachment B: Principal and School Commitment Expectations**
- **Attachment C: Alabama Course Code and Description for ECS**

A completed application will contain Section II and III (page 3 of this document) as a scanned electronic document, with responses to Sections IV and V as attached documents.

I. Program Description

Exploring Computer Science (ECS) is a year-long high school course designed to provide students with an introduction to authentic Computer Science. ECS is a college prep and Career Technical Education approved course within the state of Alabama (please see the formal description included at the end of this document in Attachment C). ECS consists of 6 units, approximately 6 weeks each. The course was developed around a framework of both Computer Science content and computational practice. Assignments and instruction are contextualized to be socially relevant and meaningful for diverse students. Units utilize a variety of tools/platforms, and culminate with projects that support engaged and socially relevant assignments. The core units of the ECS course are:

I. **Human Computer Interaction:** In this unit, students are introduced to the concepts of Computer Science while investigating the major components of computers and the suitability of these components for particular applications.

II. **Problem Solving:** This unit provides students with opportunities to become "computational thinkers" by applying a variety of problem-solving techniques as they create solutions to problems that are situated in a variety of contexts.

III. **Web Design:** This unit prepares students to take the role of a developer by expanding their knowledge of algorithms, abstraction, and web page design and applying it to the creation of web pages and documentation for users and equipment. Students will explore issues of social responsibility in web use. They will learn to plan and code their web pages using a variety of techniques and check their sites for usability. Students will apply fundamental notions of Human Computer Interaction (HCI) and ergonomics.

IV. **Programming**: Students are introduced to several basic topics associated with program design and development.

V. **Computing and Data Analysis:** In this unit, students explore how computing has facilitated new methods of managing and interpreting data. Students will use computers to translate, process and visualize data in order to find patterns and test hypotheses.

VI. **Robotics:** This unit introduces robotics as an advanced application of Computer Science that can be used to solve problems in a variety of settings from business to healthcare and how robotics enables innovation by automating processes that may be dangerous or otherwise problematic for humans.

Teachers are the key to the success of the program. They must be willing to continuously strive to improve their teaching and expand their programs. Teachers will participate in Professional Development designed to improve both their content knowledge and their teaching skills related to Computer Science, and they will collaborate with teachers from other schools throughout the summer and school year. A stipend and funds for course implementation are available to each participating teacher. **Candidate teachers must be from the Math, Science or Career Tech teaching staff. Applications will be limited to only one teacher per school.**

School administration must be willing to add the Exploring Computer Science Course (Alabama State Department Career Technical Course Code: 520043, see Attachment C) to the school schedule for the 2019-20 school year, approve the assignment of the teacher submitting this application to teach the course, and coordinate student advisement to help ensure maximum student enrollment. The specific expectations and incentives for participation in this program are included as attachments A and B. After the 2019-20 school year, the expectation is that the course will continue to be offered to students and teachers will continue to be involved in the project. **Please note that the course will need access to a computer lab in your school that has internet access.**

A completed application must be submitted by January 31, 2019. Schools will be notified of the outcome of the selection process by February 15, 2019 (or sooner). Invitations to schools to participate in the program will be contingent on the availability of project implementation funds.

II. Applicant Signatures – Add additional signature lines as needed.

_____ _____
Superintendent PRINTED NAME and SIGNATURE **Date**

_____ _____
Principal PRINTED NAME and SIGNATURE **Date**

_____ _____
Potential Computer Science Teacher PRINTED NAME and SIGNATURE **Date**

III. Applicant School Information

Please provide the school name, street address, and city/state/zipcode below:

	Telephone	Email
Superintendent		
Principal		
Potential CS Teacher		

Current teacher specialty (circle): MATH SCIENCE CAREER TECH

Is a computer lab with internet available for this course (circle)? YES NO

Demographic Data

School enrollment per grade:
_____9th _____10th _____11th _____12th

- Percent of students receiving free or reduced lunch _____ %
- Breakdown of student population by ethnicity/race (percentage):

____ American Indian ____ Asian ____ Black or African American

____ Hispanic/Latino ____ White ____ Other

IV. Computer Science Teacher Section

On a separate page attached to your school's supplication, please provide up to a one-page description of your interest in the program including:

- Your educational background
- Courses you teach or have taught
- Training you have completed related to Computer Science (if any; not required), such as courses taken during your collegiate experience
- A description of the potential opportunities for expansion of the ECS course at your school. Your response should address the number of students that could be enrolled in the ECS course, your primary motivation for wanting to teach this course, as well as how you might recruit students for the course.

V. School Section (to be completed by the Principal)

On a separate page attached to your school's supplication, please provide a short description of your interest in the program including:

1. Describe the qualities or characteristics of the student body, faculty and administration that make your school interested in offering this course. Include information about any other Computer Science courses offered at your school.
2. Describe the potential opportunity for expansion of the Computer Science program at your school
3. How many students from your school would be interested in taking the ECS course? How would you assist in recruiting students for the course?
4. Confirm your understanding that the teacher nominated for this training will have support of a computer lab with equipment to accommodate every student and that has internet connectivity.

VI. Submission Information

A completed application will contain Section II and III (page 3 of this document) as a scanned electronic document, with responses to Sections IV and V as attached documents.

Submit the completed application by January 31, 2019. Please submit an electronic copy (e.g., a scanned PDF with signatures) of the completed application to BOTH of the following email addresses:

Dr. Mohammed A. Qazi, Tuskegee University, Department of Mathematics
mqazi@tuskegee.edu

Dr. Jeff Gray, University of Alabama, Department of Computer Science
gray@cs.ua.edu

Attachment A:

Exploring Computer Science
Teacher Expectations and Incentives

Goals of the Program

- Develop a model to support a network of new high school Computer Science teachers
- Support sustainability and scalability of the Exploring Computer Science (ECS) course across Alabama
- Broaden participation in the ECS course to include young women and minorities

Expectations for Teachers

- Assist in the coordination with school Principal and administrators to approve ECS course adoption and to confirm availability of computers and internet availability for your class.
- During Spring 2019, promote and recruit students for the ECS course that will be offered in the 2019-2020 school year, with a special emphasis on recruiting young women and minority students; expected initial enrollment of at least 15-20 students, unless special circumstances are identified
- Offer the course during the 2019-2020 school year and for the next two years after that, with an expected increase in course enrollment of 10% each year
- Manage supplies purchased for the course so they are available before course begins
- Participate in on-line content-specific Professional Development during the spring and summer prior to course implementation
- Required attendance at Professional Development sessions (a strict requirement)
    - Attend a week-long Summer Institute on July 15-19, 2019 at Tuskegee University
    - Attend a two-day meeting in Fall 2019 and also in Spring 2020
    - Attend a second week-long Summer Institute in June or July 2020
- Participate in homework exercises (over the summer) and biweekly webinars with Teacher Leaders and project staff (year-round)
- Participate in an online Community of Practice:
    - Be *actively involved* in the community by posting a comment, a blog post, a question, etc. an average of once a week during the school year
    - Participate in biweekly online meetings with your peer subgroup
    - Submit questions and respond to questions posed by other teachers involved in teaching ECS
    - Share developed resources (syllabi, homework assignments, exam question, lecture presentations, etc.) with the project group
- Respond to evaluation surveys and data requests from project evaluator (Dr. David Shannon, Auburn University) and the Education and Social Science researcher (Dr. Melody Russell, Auburn University)
    - Teachers: Online surveys (pre/post); first-year interview with evaluator; mid-course survey; enrollment and retention information (including gender/minority participation)
    - Students: Online surveys (pre/post); exit interviews for selected students; anonymized grades; anonymized sample homework projects
- Participate in the CSTA (Computer Science Teachers Association) Alabama Chapter

Financial Incentives for Teachers

Each teacher will be eligible to receive up to $2,800 for meeting the project expectations and completing the designated activities. Payments will be made as follows at $200 per teacher per (full) Professional Development day:

- An initial payment of $1,000 will be made in August 2019 after completing the Summer Institute
- A payment of $400 will be made at the end of each two-day Fall/Spring Professional Development meeting during the 2019-2020 school year
- A final payment of $1,000 will be made in July/August 2020 at the end of the second 5-day Summer Institute
- All travel (mileage, meals, lodging) will be covered by the project during Summer Institutes and Fall/Spring meetings

Additional incentives

Each teacher will receive the following incentives:

- A laptop that will become the property of the teacher provided the school district commits to offering the ECS course and the teacher completes all Professional Development activities
- $250 allowance for supplies to support the teaching of ECS during the school year

Please Note: Teachers who do not offer the course in the upcoming year must return all equipment given to them by the project, or reimburse the project for those expenses.

Attachment B:

Exploring Computer Science
Principal and School Expectations

Goals of the Program

- Develop a model to support a network of new high school Computer Science teachers
- Support sustainability and scalability of the Exploring Computer Science (ECS) course across Alabama
- Broaden participation in the ECS course to include young women and minorities

Expectations for Principals and Supporting Administrators

- Add the ECS Course (520043) to the school schedule for the 2019-20 school year; plan to also offer the course the following two years
- Approve the assignment of the teacher submitting this application to teach the course
- Provide a substitute for your teacher for two days in each of the Fall/Spring training sessions (**substitute not covered by project**)
- Receive and expend the supplies stipend exclusively for the Exploring Computer Science Course
- Coordinate student advisement to help ensure maximum student enrollment, with 10% growth each year
- Allow the ECS project team to train school guidance counselors with an understanding of the unique new opportunities provided by a career in Computer Science

Attachment C:

Formal Course Description
Alabama State Department of Education

520043 - EXPLORING COMPUTER SCIENCE

Exploring Computer Science is an introductory year-long high school Computer Science course for students in Grades 9-10 focused on foundational Computer Science concepts and computational practices. Students will be introduced to the breadth of the field of Computer Science through an exploration of engaging and accessible topics. The course is designed to focus on the conceptual ideas of computing and help students understand why certain tools or languages might be utilized to solve particular problems.

The goal of Exploring Computer Science is to develop in students the computational practices of algorithm development, problem solving and programming within the context of problems that are relevant to the lives of today's students. Students will also be introduced to topics such as interface design, limits of computers, and societal and ethical issues.

Prerequisite: It is recommended that students have completed Algebra I prior to enrolling or be concurrently enrolled in Algebra I. Exploring Computer Science is designed to be a college preparatory high school course and thus, should provide a rigorous, but accessible, introduction to Computer Science. No previous Computer Science experience is required.