



ARKANSAS DEPARTMENT OF EDUCATION

CONTRACT/GRANT AWARD ROUTING FORM

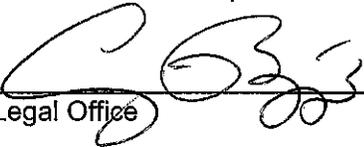
Use this routing form for obtaining approvals (in the order listed below) for **every Professional or Technical Services Contract, MOU, Grant Award or other agreement exceeding \$10,000**. When the form is complete, **the contract must be returned to the Finance Office**. The Finance Office will forward those exceeding \$50,000 to DFA for additional approvals.

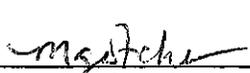
Contract with: A-State

Approved:  Date: 03/26/16
Unit Leader

Approved: _____ Date: _____
Assistant Commissioner

Approved:  Date: 4/7/16
Finance Office

Approved:  Date: 4/15/16
Legal Office

Approved:  Date: 4/20/16
Commissioner/Deputy Commissioner

Comments _____



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Comments _____



2016 Computer Science Professional Development Program Grant Memorandum of Understanding

This memorandum of understanding (MOU) is being entered into between the Arkansas Department of Education (ADE) and the Arkansas STEM Center, Arkansas Educational Service Cooperative, Arkansas public university, Arkansas public community college, or other public institution listed in Section I, hereinafter "INSTITUTION".

Section I – INSTITUTION Information

Name: **Arkansas State University**
Address: **P.O. Box 2760**
State University, AR 72467

Contact Name: **Julie Grady**
Contact Email: **jgrady@astate.edu**

Section II – Funding Information

Grant funding is subject to the availability of funds appropriated by legislative act for the purpose stated in the grant award. ADE reserves the right to reduce or void the grant award upon appropriated funds becoming reduced or unavailable. In addition, a grant agreement may be terminated by ADE at any time for any reason upon notice to the grant recipient.

ADE reserves the right to reduce funding if the initial funding projections are determined not to have been realistic based upon the number of actual applicants or other factors. Should additional funds become available for distribution, ADE will determine how these funds will be distributed.

Program funds shall not be obligated for expenditure before the beginning date of the grant or after the ending date of the grant. Funds may be requested only for those items that are reasonable and necessary for accomplishing the objectives of the program as defined in the application notice and for implementing activities as described.

Costs not included in the approved grant budget, including approved budget revisions, will not be reimbursed by ADE. Any costs that are incurred either before the start of the grant award or after the expiration of the grant award performance period are not allowable.

INSTITUTION must receive the benefit and liquidate all obligations incurred under the grant award no later than June 30, 2017.

For costs to be allowable to be charged to a grant, costs must generally meet the following criteria:

- Be necessary and reasonable for the performance of the grant and be allocable under the applicable cost principles



- Conform to limitations or exclusions set forth in the grant agreement as to types or amount of costs
- Be consistent with policies and procedures that apply uniformly to federally or state-funded activities and activities funded from other sources
- Be determined in accordance with generally accepted accounting principles (GAAP)
- Be adequately documented.

ADE will provide INSTITUTION up to **\$32,957.60** in grant funding for the ADE approved 2016 Computer Science Professional Development Program. Forward funding, not to exceed 50% of total program funding, in the amount of **\$16,478.80** will be made available to INSTITUTION on or before **April 29, 2016**. The remaining funding amount will be made available to INSTITUTION as reimbursements per the following schedule, subject to ADE receipt of invoices and attestations of meeting program requirements and MOU assurances.

The grant period for this funding is April 1, 2016 – June 30, 2017; INSTITUTION will return all funds not liquidated before June 30, 2017 to ADE by July 31, 2017.

FY2016 – Q4 Reimbursement

- Expenses, beyond already transferred amount, through June 20, 2016
- Invoice and attestation due to ADE on or before June 22, 2016
- Made available on or before July 29, 2016

FY2017 – Q1 Reimbursement

- Expenses, beyond already transferred amounts, through September 30, 2016
- Invoice and attestation due to ADE on or before October 4, 2016
- Made available on or before November 11, 2016

FY2017 – Q2 Reimbursement

- Expenses, beyond already transferred amounts, through December 31, 2016
- Invoice and attestation due to ADE on or before January 13, 2017
- Made available on or before February 24, 2017

FY2017 – Q3 Reimbursement

- Expenses, beyond already transferred amounts, through March 31, 2017
- Invoice and attestation due to ADE on or before April 5, 2017
- Made available on or before May 5, 2017

FY2017 – Q4 Reimbursement

- Expenses, beyond already transferred amounts, through June 20, 2017
- Invoice and attestation due to ADE on or before June 26, 2017



- Made available on or before July 29, 2017

FY2017 – Final Reimbursement

- Expenses, beyond already transferred amounts, through June 30, 2017
- Invoice and attestation due to ADE on or before July 10, 2017
- Made available on or before August 4, 2017

Section III – Program Delivery

INSTITUTION will provide professional development in the content area of computer science in accordance with the attached Computer Science Professional Development Program Grant Application 2016 submitted to ADE by INSTITUTION. Any provisions within the attached Computer Science Professional Development Program Grant Application 2016 that are in conflict with any provision within this MOU are declared invalid, and INSTITUTION must adhere to all provisions within this MOU.

INSTITUTION must commence and perform project activities according to established timelines. Failure to do so may result in reduction and reallocation of funds.

Section IV - Funding Use

INSTITUTION will utilize all funding awarded under this grant for activities to provide professional development to Arkansas educators in the content area of computer science, at no charge to said educators or their employing institutions.

INSTITUTION will use Fiscal control and accounting procedures that permit the tracing of funds to a level of expenditure adequate to establish that funds have been used in accordance with grant award. The INSTITUTION must maintain effective control over and accountability for all funds, property, and other assets. The INSTITUTION'S financial management system must provide for the following:

- Identification, in its accounts, of grant awards received and expended for the program under which they were received.
- Accurate, current, and complete disclosure of the financial results of each grant award or program
- Records that identify adequately the source and application of grant funds
- Effective control over, and accountability for, all funds, property and other assets

INSTITUTION acknowledges that funding awarded under this grant is subject to all applicable federal and state laws and regulations in addition to the provisions herein Section II – Funding Information.

INSTITUTION acknowledges that it has reported planned uses for the funding and will not substantially deviate from the program approved and as indicated within the attached Computer



Science Professional Development Program Grant Application 2016 submitted to ADE by
INSTITUTION

INSTITUTION will not use any grant award funds to either forward fund or reimburse program participants for any PRAXIS fees; INSTITUTION will direct participants that are seeking licensure endorsement to use the ADE CS PRAXIS Reimbursement Form found at <http://goo.gl/yHWjFF>.

INSTITUTION will insure, prior to any participant receiving a stipend as allowed under this MOU, that participant must satisfy one of the following requirements on or before June 1, 2017:

- for classroom educators completing a K-8 focus program must take part in follow-up opportunities for one school year through which they demonstrate proper CS embedding within their classes and support of other educators within their school and/or district. (maximum stipend amount of \$1,250.00)
- for district or school level educators completing a K-8 focus program must take part in follow-up opportunities for one school year through which they demonstrate how they are supporting broad classroom integration of the CS embedded standards through ongoing and meaningful professional development. (maximum stipend amount of \$1,250.00)
- for classroom educators completing the 7th/8th Grade Coding Block focus program must successfully instruct students in the 7th/8th Grade Coding Block standards and demonstrate support of other educators within their school and/or district in the 7th/8th Grade Coding Block standards and the embedded K-8 Computer Science Standards. (maximum stipend amount of \$1,500.00)
- for district or school level educators completing the 7th/8th Grade Coding Block focus program must take part in follow-up opportunities for one school year through which they demonstrate how they are supporting district-wide or school-wide implementation and instruction of the 7th/8th Grade Coding Block and the embedded K-8 Computer Science Standards through ongoing and meaningful professional development. (maximum stipend amount of \$1,500.00)
- for any individual completing an approved professional development offering focused on preparation to pass the assessment necessary to gain an ADE Computer Science Endorsement or provisional license for non-traditional programs must be successful in attaining the ADE Computer Science Endorsement (or ADE Provisional License in Computer Science) and supporting the instruction of one or more of the approved Act 187 courses through either a face-to-face or hybrid instructional model for the 2016-2017 school year. (maximum stipend amount of \$1,750.00)

INSTITUTION and participant will ensure that acceptance of any stipend is allowed under all applicable laws and rules, including district policy, prior to stipend award.

If the INSTITUTION fails to comply with any of the terms of the grant award, whether stated in a federal statute or regulation, an assurance, a state plan, application, grant award notification, or elsewhere, ADE may take one or more of the following actions:



- Temporarily withhold payments pending correction of the deficiency by the grant recipient;
- Disallow or deny both use of funds and matching credit for all or part of the cost of the activity or action not in compliance with the grant;
- Wholly or partly suspend or terminate the grant award;
- Withhold further awards for the grant program; or,
- Take other remedies that may be legally available

Section V – Reporting

INSTITUTION will complete and submit with each reimbursement request an ADE Grant Budget/Expenditure Report and Budget Narrative found at <http://goo.gl/forms/1ed8hVU4x5>. Reimbursement funds will not be released to INSTITUTION until the requisite Grant Budget/Expenditure Report and Budget Narrative is submitted.

INSTITUTION will report to the ADE grant coordinator for this grant a list, in .xls file format, of all participants on July 1, 2016 and June 30, 2017 and include the following participant information:

- First and Last Name
- Arkansas Educator Licensure System Case ID – available at <https://goo.gl/gDI4hl>
- Official Email Address
- Employing LEA
- Current Licensure Codes – *same cell, comma delimited*
- Grades Currently Teaching – *using grade bands K-2, 3-5, 6-8, 9-12*
- Percentage of program competition – *INSTITUTION determined*
- Number of scheduled PD hours, as part of this MOU, in which participant was expected to participate
- Number of scheduled PD hours, as part of this MOU, in which participant has actually participated
- Amount of any stipend awarded to participant – *N/A for July 1, 2016 report*

Section VI – Failure to Comply

ADE reserves the right to revoke a grant award for reasons including but not limited to the following:

- Noncompliance with the specified purpose of the grant award
- Failure to account for grant funds in accordance with standards for financial management, to retain proper documentation for grant expenditures, or to provide information to auditors or program monitors
- Failure to provide accurate, timely, and complete information as requested by ADE to evaluate the effectiveness of the grantee



Section VII – Other Assurances

Administration of the program, activities, and services facilitated by the funding awarded within this MOU will be in accordance with all applicable state and federal statutes and regulations.

INSTITUTION will evaluate its program semiannually to assess its progress toward achieving its goals and objectives and use its evaluation results to refine, improve, and strengthen its program and to refine its goals and objectives as appropriate.

INSTITUTION will provide ADE representatives, and/or other state agency representatives, reasonable access to the campus and classrooms where programs and/or activities facilitated by grant funds awarded under this MOU.

INSTITUTION must disclose, in a timely manner, in writing to ADE all violations of criminal law involving, but not limited to fraud, bribery, or gratuity violations potentially affecting the grant recipient. Failure to make required disclosures can result in any of the actions described in the **Failure to Comply** section.

INSTITUTION will select and utilize a system of participant selection that is impartial and does not exclude, based on district of employ or federally protected class, any ADE Licensed Arkansas Educator.

INSTITUTION must disclose in writing any potential conflict of interest between the recipient and ADE employees. In addition, all grant recipients that receive in excess of \$25,000 will be required to complete the **“Contract and Grant Disclosure and Certification Form.”**

Section VIII – Commingling of Funds

INSTITUTION must not deposit or record funds in a general account without the ability to identify each specific source of funds for any expenditures, which is known as commingling of funds. Funds from each Federal, State, local, and private funding source must be identified with a clear audit trail for each source. The accounting systems of all grant recipients must ensure that grant funds are not commingled with funds from other State or Federal agencies or private entities. Funds specifically budgeted and/or received for one project may not be used to support another

Section IX – Record Retention

Financial records, supporting documents, statistical records and all other records pertinent to the grant award shall be retained by the grant recipient for four years following the end of the grant award performance period. The retention requirement extends to books of original entry, source documents supporting accounting transactions, the general ledger, subsidiary ledgers, personnel and payroll records, cancelled checks, and related documents and records.

- Source documents include paper or electronic copies of all grant awards, applications and required financial and narrative reports.



- Personnel and payroll records shall include the signed time and attendance reports for all individuals included in the project, whether they are employed full-time, part-time, or on a volunteer basis.
- Time and effort reports are required for employees with grant-funded salaries.

Grant recipients must further agree to permit access to these records to ADE program or fiscal staff, or any of their authorized representatives, as needed for monitoring purpose.

Section X – Carryover of Grant Funds

All encumbrances/obligations shall occur on or between April 1, 2016 and June 30, 2017.

INSTITUTION must receive the benefit and liquidate all obligations incurred under the grant award no later than June 30, 2017

If the grant recipient has not obligated all of its grant funds by June 30, 2017, any unexpended grant funds will be requested for return to ADE.

Johnny Key, Commissioner of Education
Arkansas Department of Education

Date

INSTITUTION Authorized Representative
Printed Name

INSTITUTION Authorized Representative
Title

INSTITUTION Authorized Representative
Signature

Date



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Handwritten signature of Johnny Key

Johnny Key, Commissioner of Education
Arkansas Department of Education

Handwritten date 4/26/16

Date

Handwritten signature of Andrew Sustich

INSTITUTION Authorized Representative
Printed Name

Handwritten signature of Andrew Sustich

INSTITUTION Authorized Representative
Signature

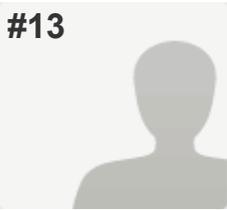
Vice Provost for Research & Graduate Studies

INSTITUTION Authorized Representative
Title

Handwritten date 4/22/16

Date

#13



COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, February 25, 2016 11:52:17 AM
Last Modified: Thursday, February 25, 2016 1:08:34 PM
Time Spent: 01:16:16
IP Address: 173.218.106.93

PAGE 1: General Information

Q1: Organization Name	Arkansas State University (A-State); College of Sciences and Mathematics; Department of Computer Science; Rural STEM Education Center; Grant title: Computer Science Praxis (5651) Preparation Institute
Q2: Organization Type	Arkansas based public university , Other Arkansas based public institution (subject to ADE approval) and Rural STEM Education Center member of AR STEM Coalition
Q3: Organization LEA (if applicable)	N/A
Q4: Organization Mailing Address (Line 1)	PO Box 2760
Q5: Organization Mailing Address (Line 2) - optional	N/A
Q6: Organization Mailing Address (City)	State University
Q7: Organization Mailing Address (Zip Code)	72467
Q8: Contact Person (First Name)	University: Research and Technology Transfer Director: Rebekah; Grant Director: Julie
Q9: Contact Person (Last Name)	University: Craig; Grant Director: Grady
Q10: Contact Person (Email Address)	jgrady@astate.edu
Q11: Contact Person (Telephone XXX-XXX-XXXX)	University: 870-972-2694; Grant Director: 870-680-8100
Q12: Contact Person (Title)	University: Director of Research Development; Grant Director: Associate Professor; Director of the Rural STEM Education Center

PAGE 2: Program Focus Selection

Q13: Please select a program focus for this application (NOTE: each organization may submit a separate application for each focus area for which they wish to offer)	Computer Science Endorsement and High School Level Computer Science Instruction Preparation
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PAGE 3: Program Information

Q14: Provide a program description. Be certain to provide information related to the curriculum, content guide, and materials to be utilized

With the increase in state-level, national, and global jobs that require expertise in engineering, information science, computing, and communications, it is critical that high school students are prepared to be successful in college courses and majors leading to these jobs. The authors of *Ensuring Exemplary Teaching in an Essential Discipline: Addressing the Crisis in Computer Science Teacher Certification* (CSTA Teacher Certification Task Force, 2008) acknowledge that high school student enrollment in computer science courses has decreased, fewer students from underrepresented populations in Computer Science fields enroll in computer science courses, and the number of computer science courses available to high school students has decreased. To move Arkansas forward with addressing these concerns, the Regular Session of the 90th General Assembly passed Act 187 which calls for all Arkansas public high schools and public charter schools to provide at least one high school level computer science course.

However, increasing high school course availability and student enrollment in these courses is not sufficient to boost the number of Arkansas students prepared for high-tech, computer-based college majors and future professions. Student success in high school computer science, which may lead to success in college courses and careers in fields dependent upon computer science background, depends on the quality of instruction. The quality of instruction is largely influenced by teachers' content knowledge and ability to lead a class that prioritizes student thinking and engagement (The New Educational Imperative: Improving High School Computer Science Education Final Report; CSTA Curriculum Improvement Task Force; 2005).

Given that many schools in the state lack qualified Computer Science teachers, this project will fund professional development that will assist educators in passing the assessment necessary to gain an ADE Computer Science Endorsement on an Arkansas Educator's License (or individuals in nontraditional licensure programs to pass the assessment necessary to obtain an ADE Provisional License in Computer Science).

In order to determine if high school principals feel there is a need for this institute, the Director of the Arkansas State University Educational Renewal Zone sent a three-question survey to principals whose schools are members of the Northeast Arkansas Education Service Cooperative, Crowley's Ridge Education Service Cooperative, and Great Rivers Education Service Cooperative. The Director of the A-State Rural STEM Education Center expanded the survey to reach principals in the northcentral area by asking the Northcentral Arkansas Education Service Cooperative to forward the survey to member school principals. The questions included:

1. Does your high school offer a high school level computer science course approved by Act 187 (ADE Computer Science and Mathematics, ADE Essentials of Computer Programming, College Board Advanced Placement Computer Science A, International Baccalaureate (IB) Computer Science)?
2. Do you have a teacher in your high school who has passed the Computer Science Praxis test #5651 and has the Computer Science Endorsement?
3. Are you interested in one of your faculty members attending a 14-day summer (2016) and school year (2016-2017) institute to help them with passing the Computer Science Praxis test? (May require a registration fee of approximately \$150. Teacher will earn stipend of \$1,870 if they pass the Praxis by June 1, 2017.)

Eighteen principals responded to the survey. Of these 18, 14 stated that there is no teacher at their school who has passed the Computer Science Praxis. Twelve of the principals agreed that they are interested in one of their faculty attending the Computer Science Praxis Preparation Institute. Three principals stated that they are not sure if they are interested in one of their teachers attending the institute. Clearly there is strong interest by high school principals in these four education service cooperative service areas for the institute. Given the response in this region of the state, it is expected that principals outside of this region are also interested in sending teachers to a Praxis preparation institute.

PROGRAM INFORMATION

Provide a program description. Be certain to provide information related to curriculum, content guide, and materials to be utilized.

In order to assist teachers with passing the Praxis II Computer Science exam #5651, this project is designed to engage 12 teachers, statewide, in a total of 14 days of face-to-face computer science instruction. Ten of the instruction days will occur during June 2016, followed by two face-to-face sessions at the end of the summer and two face-to-face sessions during the 2016-2017 school year. In addition, the instructor will be available to answer teachers' questions upon request by email and phone during the school year. The classroom instruction will target Praxis content, preparing to take the Computer Science Praxis II exam, and pedagogy. Given that more knowledge and understanding of computer science than can be discussed during these 14 days will be needed to pass the Praxis, participants will also be expected to complete assignments outside of the face-to-face sessions to practice and reinforce their learning. The syllabus provides day-to-day topics and instructional plans. In addition, the Praxis objectives are aligned with these topics and plans. These tentative plans will be re-evaluated, and possibly revised, at the close of each institute session

Computer Science Professional Development Program Grant Application 2016

day based on teachers' progress and reactions to lessons.

The following materials and resources will be used to support participant learning during the institute sessions or for teacher independent work:

- Praxis Study Companion for Computer Science 5651
- Lynda.com: IT and Developer courses
- Codecademy Python course (<https://www.codecademy.com/learn/python>)
- How To Think Like a Computer Scientist (<http://openbookproject.net/thinkes/python/english3e/>)
- Runestone Interactive Python (<http://interactivepython.org>)
- This is CS50 (www.youtube.com)
- Introduction to Computer Science and Programming (MIT OpenCourseware)
- Computer Science Illuminated, 6th ed. (N. Dale & J. Lewis; Jones & Bartlett Learning)
- Guide to Teaching Computer Science An Activity-Based Approach, 2nd ed. (O. Hazzan, T. Lapidot, & N. Ragonis; 2014)

June 6, 2016

Introduction

Overview of Computer Science Praxis (5651) including Content Categories (Technology Applications Core, Program Design/Development, Programming Language Topics)

Concepts: Binary Values and Number Systems, Data Representation

Programming: Programming Style Conventions; Commenting and Documentation and Python Introduction (Variables and Constants, Expressions, Statement, Data types)

Praxis Objectives

Concepts: Praxis Study Guide Test Specification (PSG) II.C.1, II.C.2, II.B.3

Programming: PSG III.A.1, III.B.1; Computer Science Illuminated: §2.1, 2.2; §3.1, 3.2, 3.3

Assignments/Reading

Reading

Computer Science Illuminated: §2.1, 2.2 – Binary, §3.1, 3.2, 3.3 – Data Representation

Guide to Teaching Computer Science: Chapter 3 – Overview of the Discipline of Computer Science; Chapter 5 – Problem Solving Strategies

Assignment

Programming to capture numeric console input; perform calculation(s) on captured input and present result(s) as console output.

June 7, 2016

Concepts: Problem Solving Strategies including Algorithm Construction; Algorithm Design Patterns (Divide and Conquer, Brute Force)

Programming: Python Conditional Control Structures and Iterative Control Structures

Praxis Objectives

Concepts: PSG II.A.2, II.A.3, II.A.5

Programming: PSG III.B.2, III.B.3; Computer Science Illuminated: §6.5, 6.6, §7.1, 7.2

Reading

Computer Science Illuminated: §6.5, 6.6 – Algorithms and Testing; §7.1, 7.2 - Algorithms

Assignment

Programming to reinforce use of IF and IF-ELSE control structures.

June 8, 2016

Concepts: String Manipulation and File I/O

Programming: Python Iterative Control Structures and Arrays (One-dimensional, Multi-dimensional)

Praxis Objectives

Programming: PSG III.A.5, III.A.6, III.B.4, III.B.5, III.B.6; Computer Science Illuminated: §7.3; §11.1, 11.2

Reading

Computer Science Illuminated: §7.3 – Arrays; §11.1, 11.2 – File Systems

Guide to Teaching Computer Science: §11.3 – Teaching One-Dimensional Arrays

Assignment

Programming to reinforce use of FOR and WHILE control structures utilizing arrays or strings

Computer Science Professional Development Program Grant Application 2016

Programming to reinforce use of FOR and WHILE control structures utilizing arrays of strings

June 9, 2016

Concepts: Programming Language Paradigms; Object-Oriented Paradigm

Programming: Python Functions, Return values, and Variable passing

Praxis Objectives

Programming: PSG III.A.2, III.A.3, III.A.4; Computer Science Illuminated: §9.1, 9.3

Reading

Computer Science Illuminated: §9.1, 9.3, 9.5 – Programming Languages and Object-Oriented Design

Assignment: Programming to create a function that accepts parameters and returns a value

June 10, 2016

Concepts: Object-Oriented Methodology including Classes, Encapsulation, Inheritance, Polymorphism

Programming: Python Functions, Methods, and Classes

Praxis Objectives

Programming: PSG III.A.4, III.A.8; Computer Science Illuminated: §9.5

Reading

Computer Science Illuminated: §9.1, 9.3, 9.5 - Programming Languages and Object-Oriented Design

Guide to Teaching Computer Science: Chapter 9 – Types of Questions in Computer Science Education

Assignment: Creating a class with attributes and methods.

June 13, 2016

Concepts: Discussion of Searching Algorithms; Discussion of Sorting Algorithms

Programming: Python Linear Searching and Binary Search Implementation

Praxis Objectives

Programming: PSG III.C.1; Computer Science Illuminated: §7.4, 7.5

Reading

Computer Science Illuminated: §7.4, 7.5 – Searching and Sorting Algorithms

Assignment

Programming to Implement Number Guessing Game

June 14, 2016

Concepts: Discussion of Searching Algorithms; Discussion of Sorting Algorithms (Selection Sort, Insertion Sort, Bubble Sort)

Programming: Python Selection Sort Implementation and Insertion Sort Implementation

Praxis Objectives

Programming: PSG III.C.2; Computer Science Illuminated: §7.4, 7.5

Reading

Computer Science Illuminated: §7.4, 7.5 – Searching and Sorting Algorithms

Assignment

Programming to Implement Bubble Sort

June 15, 2016

Concepts: Abstract Data Types; Data Structures

Programming: Python Abstract data types (Stacks, Queues)

Praxis Objectives

Programming: PSG III.A.7, III.A.8; Computer Science Illuminated: §8.1, 8.2, 8.3

Reading

Computer Science Illuminated: §8.1, 8.2, 8.3, 8.4, 8.5 – Abstract Data Types

Assignment

Programming to Implement a Queue

Computer Science Professional Development Program Grant Application 2016

June 16, 2016

Concepts: Abstract Data Types; Data Structures
Programming: Python Abstract data types (Linked Lists, Trees)

Praxis Objectives

Programming: PSG III.A.7, III.A.8; Computer Science Illuminated: §8.1, 8.4, 8.5

Reading

Computer Science Illuminated: §8.1, 8.2, 8.3, 8.4, 8.5 – Abstract Data Types

Assignment

Python Programming Project

June 17, 2016

Concepts: Software creation process (Life cycle models); Recap of Computer Science Praxis (5651) Content Categories (Technology Applications Core, Program Design/Development, Programming Language Topics) and Study Guide

Praxis Objectives

Concepts: PSG II.A.1

Reading

Guide to Teaching Computer Science: Chapter 7 – Teaching Methods in Computer Science Education; Chapter 9 – Types of Questions in Computer Science Education; Chapter 12 – The Case of Recursion

Assignment

Python programming project

July 28, 2016

Python Programming Project: Problems Encountered; Demonstrations

Concepts: Recursion; Recursive Algorithms

Programming: Python Recursive Algorithm Implementation

Reading

Guide to Teaching Computer Science: Chapter 7 – Teaching Methods in Computer Science Education; Chapter 9 – Types of Questions in Computer Science Education

Assignment

Recursion based programming to implement Fibonacci sequence or Factorial calculation

July 29, 2016

Computer Science in the Classroom; Projects and Activities; Resources (CS Unplugged; Lynda.com; Computer Science Teachers Association); Support Network

Plans for two school-year follow-up days will be determined by progress made during the summer and teacher requests.

Q15: If your organization plans to contract with an outside vendor/provider to provide professional development, provide the name and website URL for that vendor/provider. (N/A for not applicable)

The A-State Department of Computer Science does not plan to hire an outside vendor/provider to provide instruction, however, the department will be partnering with two other organizations on campus for their support and services: the College of Education and Behavioral Science Educational Renewal Zone and the School of Teacher Education and Leadership Rural STEM Education Center. The Educational Renewal Zone has already helped distribute a needs and interest survey for principals to indicate their interest in the institute. The Educational Renewal Zone has also offered to assist with recruiting teachers and purchasing USB flash drives for the participants. The Rural STEM Education Center Director has supported the Department of Computer Science with writing the grant proposal, and will continue in the role of Project Director if the grant is awarded. The Rural STEM Education Center will help recruit teachers and donate 3-ring binders to the institute.

Q16: Provide a schedule for the program. Be certain to include the days, times, and number of hours that the sessions are to meet.

The professional development will be held at Arkansas State University in Jonesboro. The schedule for the professional development includes

- a. 10 days of face-to-face professional development; 8:30 AM -3:30 PM; June 6-10 and June 13-17, 2016
- b. Two follow-up days at the end of July before teachers return to school and prior to the August Praxis test dates; 8:30-AM -3:30 PM
- c. Two follow-up days during the year, one prior to the November Praxis test date and one prior to the February Praxis test date; 8:30 AM-3:30 PM
- d. Mentoring by the instructor during the academic year at a convenient time for individual teachers and instructor

Q17: Provide a detailed plan to document evidence of program performance and success of the participants including all required and requested reporting.

The primary goal of the project is to provide professional development that assists 12 teachers with passing the Computer Science Praxis exam #5651. Of secondary import is for participants to learn about strategies to teach computer science and gain confidence in teaching computer science. Evidence of program performance and success of the participants will include the following:

- a. Documentation of teacher day-to-day attendance at the professional development sessions including sign-in and sign-out times
- b. Documentation of teacher success passing the Computer Science Praxis before June 1, 2017
- c. Results of pre- and post-surveys completed by teachers to determine their perceptions of changes in their computer science content knowledge, knowledge of computer science instructional strategies, and confidence in teaching computer science
- d. Results of a post-survey completed by teachers to rate their experiences with the project professional development

Q18: Provide the qualifications required for all staff and instructors. If a project manager or director can be identified, please do so at this time.

The lead computer science instructor for the project will be Mr. Jake A. Qualls, Instructor of Computer Science at Arkansas State University. Mr. Qualls has his Master's degree in Computer Science from Arkansas State University. Mr. Qualls has taught at Arkansas State University for five years and is experienced with teaching university courses such as Computer Organization, Software Engineering, Algorithms and Advanced Data Structures, and Operating Systems. In addition, Mr. Qualls led the instruction for the 2014 Congressional App Challenge at Arkansas State University, which supported student programming teams from Northeast Arkansas schools. Mr. Qualls has also been involved with Arkansas Department of Education efforts to develop computer science curriculum. He was a member of the ADE Curriculum Committee responsible for designing the Essentials of Computer Programming course.

Support personnel will also be hired to help the teachers during their application of the computer science content. A Teaching Assistant for the afternoon application sessions will give teachers more opportunities to work one-on-one with a content expert. The goal is to hire an undergraduate student in the Department of Computer Science who is very knowledgeable about Python, and has assisted with undergraduate computer science classes at A-State such as Concepts of Programming.

All non-instructional support work will be managed by a Project Director, Dr. Julie R. Grady. Dr. Grady was awarded her PhD from Virginia Tech in Curriculum and Instruction. She is the Director of the Arkansas State University Rural STEM Education Center and Associate Professor in the School of Teacher Education and Leadership. During the past five years, Dr. Grady has successfully directed nine teacher professional development grants including No Child Left Behind grants administered by ADE and ADHE, three Commitment to Excellence in STEM grants administered by the Arkansas STEM Coalition, and five ADE STEM Center Mathematics and Specialists grants. As Project Director, Dr. Grady will be responsible for teacher recruitment and registration; documenting teacher attendance and awarding professional development hours and certificates; making arrangements for lodging, lunches, and parking tags for teachers; obtaining teacher and principal contracts regarding requirements for teacher participation and stipend receipt; and collecting and documenting evidence of program performance. Dr. Grady will also work with Arkansas State University's Department of Computer Science staff and the Sponsored Programs staff to ensure spending is aligned with the approved budget, and that all necessary financial paperwork is completed for purchasing materials, paying instructors, and awarding teachers their stipends. Dr. Grady will also complete all narrative reports required by the grant and ensure that financial reports are completed by the A-State Sponsored Programs Accounting office.

PAGE 4: Program Budget

Q19: Total Grant Amount Requested 47112.65

Q20: Grant Forward Funding Requested in Dollar Amount (maximum of 50% of total proposed grant) - NOTE: organization will be required to return all unused or excess funding once program completion information is submitted. 23556.33

Q21: Proposed Cost Per Participant 3926.05

Q22: Estimated Number of Participants 12.0

Q23: Summary of the Program's Proposed Budget

A. Salaries

1. Jake A. Qualls, lead instructor; 36 days during summer (planning, preparation, instruction) x \$231.08/day=\$8,318.89
 2. Julie R. Grady, Project Director; 10 days during summer x \$338.06 /day = \$3,380.60
 3. Teaching Assistant (Undergraduate student) 14 half-days= 3 hrs/day x 14 days x \$10/hr=\$420.00
- Note: Salary is only being requested for summer work. All work during 9-month, school-year contracts will be donated to the project.
TOTAL SALARY= \$12,119.49

Fringes

1. Jake A. Qualls, 47.24% x \$8318.89 = \$3,929.84
 2. Julie R. Grady, 17.55% x \$3380.60= \$593.30
 3. Teaching Assistant N/A
- TOTAL FRINGE= \$4,523.14
TOTAL SALARY AND FRINGE= \$16,642.63

B. Participant Costs

1. Registration fees (June summer lunches, campus parking tags) \$150/teacher x 12 teachers=1,800 (Participant Costs)
 2. Books
 - a. Computer Science Illuminated, 6th ed. (N. Dale & J. Lewis; ISBN 9781284055917; Jones & Bartlett Learning) Quote from A-State Bookstore; \$169.75/book x 12 teachers = \$2,037.00 + 8.5% taxes (\$173.15)= \$2,210.15
 - b. Guide to Teaching Computer Science An Activity-Based Approach, 2nd ed. (O. Hazzan, T. Lapidot, & N. Ragonis; 2014; Hardcover ISBN 978-1-4471-6629-0) Quote from A-State Bookstore; \$80.00 x 12 teachers= \$960 + 8.5% taxes (\$81.60)= \$1,041.60
 3. Lodging for teachers who travel more than 60 miles to attend institute (Note: teachers in the NE, NC, and Delta regions of the state travel on rural roads with restricted speed limits); 6 teachers x 14 nights x \$102/night (double occupancy)= \$4,284.00
- Note: 12 jump drives will be donated by the ASU Educational Renewal Zone. (approx. \$132)
12 3-ring binders will be donated by the ASU Rural STEM Education Center (approx. \$144)
TOTAL PARTICIPANT COSTS= \$1,800 (Participant Costs) \$7,535.75 (Grant Funds)

C. Instructor and Instructional Costs

All instructor costs (books, mileage, phone, photocopying) will be funded by the A-State Department of Computer Science
TOTAL INSTRUCTOR AND INSTRUCTIONAL COSTS= \$0

Subtotal: \$1800 (Participant Costs) \$24,178.38 (Grant Funds)
INDIRECT COSTS (8% of grant costs not including teacher stipends)= \$1,934.27
TOTAL COSTS= \$1800 (Participant Costs) \$26,112.65 (grant funds)

Q24: Completer Individual Stipend Amount (if applicable) 1750.0

Q25: Total Amount Allocated for Participant Stipends (if applicable) 21000.0

PAGE 5: Assurances and Certification

Q26: WE, THE UNDERSIGNED, CERTIFY that the information contained in this application, is complete and accurate to the best of our knowledge; that the necessary assurances of compliance with applicable state and federal statutes, rules, and regulations will be met; and, that the indicated organization designated in this application is authorized to administer this grant. WE FURTHER CERTIFY that the assurances listed above, have been or will be satisfied and that all facts, figures, and representations in this application are correct to the best of our knowledge.

Yes

Q27: First and last name of the authorized Representative certifying this application on behalf of the organization.

Andy Sustich

Q28: Title of authorized Representative certifying this application on behalf of the organization.

Vice Provost for Research & Graduate Studies

Subject: Revised CS Grant budget and justification

Date: Friday, March 18, 2016 at 11:56:35 AM Central Daylight Time

From: Emily Devereux

To: Anthony Owen (ADE)

CC: Julie Grady

Anthony,

On behalf of the university, please find attached Julie Grady's revised budget and justification for the CS institute. If you have any questions or need clarification, do not hesitate to contact either Julie or myself.

Thanks,

-Emily

Emily Devereux, BA, MPA

Associate Director of Research Development

Advisor, A-State Student Research Council

P.O. Box 2760 | State University, AR 72467

322 University Loop West Circle | Jonesboro, AR 72401

Office: (870) 972-2447 | Fax: (870) 972-2336

edevereux@astate.edu | <http://www.astate.edu>

Connect with me on LinkedIn!

<https://www.linkedin.com/in/devereuxemily>

GENERAL INFORMATION

1. Organization Name

Arkansas State University (A-State); College of Sciences and Mathematics; Department of Computer Science

2. Organization Type

Public university

3. Organization LEA

N/A

4. Organization Mailing Address (Line 1)

PO Box 2760

5. Organization Mailing Address (Line 2 optional)

N/A

6. Organization Mailing Address (City)

State University

7. Organization Mailing Address (Zip Code)

72467

8. Contact Person (First Name)

University: Research and Technology Transfer Director: Rebekah
Program Manager: Julie

9. Contact Person (Last Name)

University: Craig
Program Manager: Grady

10. Contact Person (Email Address)

University: research@astate.edu
Program Manager: jgrady@astate.edu

11. Contact Person (Telephone)

University: 870-972-2694
Program Manager: 870-680-8100

12. Contact Person (Title)

University: Director of Research Development

Program Manager: Director, Rural STEM Education Center; Associate Professor of Science Education

PROGRAM FOCUS

13. Please select a program focus for this application

With the increase in state-level, national, and global jobs that require expertise in engineering, information science, computing, and communications, it is critical that high school students are prepared to be successful in college courses and majors leading to these jobs. The authors of *Ensuring Exemplary Teaching in an Essential Discipline: Addressing the Crisis in Computer Science Teacher Certification* (CSTA Teacher Certification Task Force, 2008) acknowledge that high school student enrollment in computer science courses has decreased, fewer students from underrepresented populations in Computer Science fields enroll in computer science courses, and the number of computer science courses available to high school students has decreased. To move Arkansas forward with addressing these concerns, the Regular Session of the 90th General Assembly passed Act 187 which calls for all Arkansas public high schools and public charter schools to provide at least one high school level computer science course.

However, increasing high school course availability and student enrollment in these courses is not sufficient to boost the number of Arkansas students prepared for high-tech, computer-based college majors and future professions. Student success in high school computer science, which may lead to success in college courses and careers in fields dependent upon computer science background, depends on the quality of instruction. The quality of instruction is largely influenced by teachers' content knowledge and ability to lead a class that prioritizes student thinking and engagement (*The New Educational Imperative: Improving High School Computer Science Education Final Report*; CSTA Curriculum Improvement Task Force; 2005).

Given that many schools in the state lack qualified Computer Science teachers, this project will fund professional development that will assist educators in passing the assessment necessary to gain an ADE Computer Science Endorsement on an Arkansas Educator's License (or individuals in nontraditional licensure programs to pass the assessment necessary to obtain an ADE Provisional License in Computer Science).

In order to determine if high school principals feel there is a need for this institute, the Director of the Arkansas State University Educational Renewal Zone sent a three-question survey to principals whose schools are members of the Northeast Arkansas Education Service

Cooperative, Crowley's Ridge Education Service Cooperative, and Great Rivers Education Service Cooperative. The Director of the A-State Rural STEM Education Center expanded the survey to reach principals in the northcentral area by asking the Northcentral Arkansas Education Service Cooperative to forward the survey to member school principals. The questions included:

1. Does your high school offer a high school level computer science course approved by Act 187 (ADE Computer Science and Mathematics, ADE Essentials of Computer Programming, College Board Advanced Placement Computer Science A, International Baccalaureate (IB) Computer Science)?
2. Do you have a teacher in your high school who has passed the Computer Science Praxis test #5651 and has the Computer Science Endorsement?
3. Are you interested in one of your faculty members attending a 14-day summer (2016) and school year (2016-2017) institute to help them with passing the Computer Science Praxis test? (May require a registration fee of approximately \$150. Teacher will earn stipend of \$1,870 if they pass the Praxis by June 1, 2017.)

Eighteen principals responded to the survey. Of these 18, 14 stated that there is no teacher at their school who has passed the Computer Science Praxis. Twelve of the principals agreed that they are interested in one of their faculty attending the Computer Science Praxis Preparation Institute. Three principals stated that they are not sure if they are interested in one of their teachers attending the institute. Clearly there is strong interest by high school principals in these four education service cooperative service areas for the institute. Given the response in this region of the state, it is expected that principals outside of this region are also interested in sending teachers to a Praxis preparation institute.

PROGRAM INFORMATION

14. Provide a program description. Be certain to provide information related to curriculum, content guide, and materials to be utilized.

In order to assist teachers with passing the Praxis II Computer Science exam #5651, this project is designed to engage 12 teachers, statewide, in a total of 14 days of face-to-face computer science instruction. Ten of the instruction days will occur during June 2016, followed by two face-to-face sessions at the end of the summer and two face-to-face sessions during the 2016-2017 school year. In addition, the instructor will be available to answer teachers' questions upon request by email and phone during the school year. The classroom instruction will target Praxis content, preparing to take the Computer Science Praxis II exam, and pedagogy. Given that more knowledge and understanding of computer science than can be discussed during

these 14 days will be needed to pass the Praxis, participants will also be expected to complete assignments outside of the face-to-face sessions to practice and reinforce their learning.

A syllabus for the institute is provided in table format. The syllabus includes day-to-day topics and instructional plans. In addition, the Praxis objectives are aligned with these topics and plans. These tentative plans will be re-evaluated, and possibly revised, at the close of each institute session day based on teachers' progress and reactions to lessons.

The following materials and resources will be used to support participant learning during the institute sessions or for teacher independent work:

- *Praxis Study Companion for Computer Science 5651*
- Lynda.com: IT and Developer courses
- Codecademy Python course (<https://www.codecademy.com/learn/python>)
- How To Think Like a Computer Scientist
(<http://openbookproject.net/thinkes/python/english3e/>)
- Runestone Interactive Python (<http://interactivepython.org>)
- This is CS50 (www.youtube.com)
- Introduction to Computer Science and Programming (MIT OpenCourseware)
- *Computer Science Illuminated*, 6th ed. (N. Dale & J. Lewis; Jones & Bartlett Learning)
- *Guide to Teaching Computer Science An Activity-Based Approach*, 2nd ed. (O. Hazzan, T. Lapidot, & N. Ragonis; 2014)

Tentative *Computer Science Praxis (5651) Preparation Institute* Syllabus
June 6-10, 13-17 and July 28-29

Day	Outline	Praxis Objectives	Assignments/ Reading
June 6, 2016	<ul style="list-style-type: none"> • Introduction • Overview of Computer Science Praxis (5651) <ul style="list-style-type: none"> ○ Content Categories <ul style="list-style-type: none"> ▪ Technology Applications Core ▪ Program Design/Development ▪ Programming Language Topics • Concepts: <ul style="list-style-type: none"> ○ Binary Values and Number Systems ○ Data Representation • Programming: <ul style="list-style-type: none"> ○ Programming Style Conventions ○ Commenting and Documentation ○ Python Introduction <ul style="list-style-type: none"> ▪ Variables and Constants ▪ Expressions ▪ Statement ▪ Data types 	<p>Concepts:</p> <p><i>Praxis Study Guide</i> Test Specification (PSG) II.C.1, II.C.2, II.B.3</p> <p>Programming:</p> <p>PSG III.A.1, III.B.1</p> <p><i>Computer Science Illuminated:</i> §2.1, 2.2 §3.1, 3.2, 3.3</p>	<p>Reading:</p> <p><i>Computer Science Illuminated:</i> §2.1, 2.2 – Binary §3.1, 3.2, 3.3 – Data Representation</p> <p><i>Guide to Teaching Computer Science:</i> Chapter 3 – Overview of the Discipline of Computer Science Chapter 5 – Problem Solving Strategies</p> <p>Assignment: Programming to capture numeric console input. Perform calculation(s) on captured input and present result(s) as console output.</p>

<p>June 7, 2016</p>	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Problem Solving Strategies ○ Algorithm Construction ○ Algorithm Design Patterns <ul style="list-style-type: none"> ▪ Divide and Conquer ▪ Brute Force • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Conditional Control Structures ▪ Iterative Control Structures 	<p>Concepts:</p> <p><i>PSG II.A.2, II.A.3, II.A.5</i></p> <p>Programming:</p> <p><i>PSG III.B.2, III.B.3</i></p> <p><i>Computer Science Illuminated:</i> §6.5, 6.6 §7.1, 7.2</p>	<p>Reading:</p> <p><i>Computer Science Illuminated:</i> §6.5, 6.6 – Algorithms and Testing §7.1, 7.2 - Algorithms</p> <p>Assignment: Programming to reinforce use of IF and IF-ELSE control structures.</p>
<p>June 8, 2016</p>	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ String Manipulation ○ File I/O • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Iterative Control Structures ▪ Arrays <ul style="list-style-type: none"> • One-dimensional • Multi-dimensional 	<p>Programming:</p> <p><i>PSG III.A.5, III.A.6, III.B.4, III.B.5, III.B.6</i></p> <p><i>Computer Science Illuminated:</i> §7.3 §11.1, 11.2</p>	<p>Reading:</p> <p><i>Computer Science Illuminated:</i> §7.3 - Arrays §11.1, 11.2 – File Systems</p> <p><i>Guide to Teaching Computer Science:</i> §11.3 – Teaching One-Dimensional Arrays</p> <p>Assignment: Programming to reinforce use of FOR and WHILE control structures utilizing arrays or strings.</p>
<p>June 9, 2016</p>	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Programming Language Paradigms ○ Object-Oriented Paradigm 	<p>Programming:</p> <p><i>PSG III.A.2,</i></p>	<p>Reading:</p> <p><i>Computer Science</i></p>

	<ul style="list-style-type: none"> • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Functions ▪ Return values ▪ Variable passing 	III.A.3, III.A.4 <i>Computer Science</i> <i>Illuminated:</i> §9.1, 9.3	<i>Illuminated:</i> §9.1, 9.3, 9.5 – Programming Languages and Object-Oriented Design Assignment: Programming to create a function that accepts parameters and returns a value.
June 10, 2016	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Object-Oriented Methodology <ul style="list-style-type: none"> ▪ Classes ▪ Encapsulation ▪ Inheritance ▪ Polymorphism • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Functions ▪ Methods ▪ Classes 	Programming: PSG III.A.4, III.A.8 <i>Computer Science</i> <i>Illuminated:</i> §9.5	Reading: <i>Computer Science</i> <i>Illuminated:</i> §9.1, 9.3, 9.5 - Programming Languages and Object-Oriented Design <i>Guide to Teaching Computer Science:</i> Chapter 9 – Types of Questions in Computer Science Education Assignment: Creating a class with attributes and methods.
June 13, 2016	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Discussion of Searching Algorithms ○ Discussion of Sorting Algorithms 	Programming: PSG III.C.1	Reading: <i>Computer Science</i> <i>Illuminated:</i>

	<ul style="list-style-type: none"> • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Linear Searching ▪ Binary Search Implementation 	<i>Computer Science Illuminated:</i> §7.4, 7.5	§7.4, 7.5 – Searching and Sorting Algorithms Assignment: Programming to Implement Number Guessing Game
June 14, 2016	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Discussion of Searching Algorithms ○ Discussion of Sorting Algorithms <ul style="list-style-type: none"> ▪ Selection Sort ▪ Insertion Sort ▪ Bubble Sort • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Selection Sort Implementation ▪ Insertion Sort Implementation 	Programming: PSG III.C.2 <i>Computer Science Illuminated:</i> §7.4, 7.5	Reading: <i>Computer Science Illuminated:</i> §7.4, 7.5 – Searching and Sorting Algorithms Assignment: Programming to Implement Bubble Sort
June 15, 2016	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Abstract Data Types ○ Data Structures • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Abstract data types <ul style="list-style-type: none"> • Stacks • Queues 	Programming: PSG III.A.7, III.A.8 <i>Computer Science Illuminated:</i> §8.1, 8.2, 8.3	Reading: <i>Computer Science Illuminated:</i> §8.1, 8.2, 8.3, 8.4, 8.5 – Abstract Data Types Assignment: Programming to Implement a Queue
June 16, 2016	<ul style="list-style-type: none"> • Concepts: <ul style="list-style-type: none"> ○ Abstract Data Types ○ Data Structures • Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Abstract data types <ul style="list-style-type: none"> • Linked Lists 	Programming: PSG III.A.7, III.A.8 <i>Computer Science</i>	Reading: <i>Computer Science Illuminated:</i> §8.1, 8.2, 8.3, 8.4, 8.5 – Abstract Data

	<ul style="list-style-type: none"> • Trees 	<i>Illuminated:</i> §8.1, 8.4, 8.5	Types Assignment: Python Programming Project.
June 17, 2016	<ul style="list-style-type: none"> ▪ Concepts: <ul style="list-style-type: none"> ○ Software creation process <ul style="list-style-type: none"> ▪ Life cycle models • Recap of Computer Science Praxis (5651) <ul style="list-style-type: none"> ○ Content Categories <ul style="list-style-type: none"> ▪ Technology Applications Core ▪ Program Design/Development ▪ Programming Language Topics ○ Study Guide 	Concepts: PSG II.A.1	Reading: <i>Guide to Teaching Computer Science:</i> Chapter 7 – <i>Teaching Methods in Computer Science Education</i> Chapter 9 – <i>Types of Questions in Computer Science Education</i> Chapter 12 – <i>The Case of Recursion</i> Assignment: Python programming project.
July 28, 2016	<ul style="list-style-type: none"> ▪ Python Programming Project <ul style="list-style-type: none"> ○ Problems Encountered ○ Demonstrations ▪ Concepts: <ul style="list-style-type: none"> ○ Recursion ○ Recursive Algorithms ▪ Programming <ul style="list-style-type: none"> ○ Python <ul style="list-style-type: none"> ▪ Recursive Algorithm Implementation 		Reading: <i>Guide to Teaching Computer Science:</i> Chapter 7 – <i>Teaching Methods in Computer Science Education</i> Chapter 9 – <i>Types of</i>

			<p>Questions in Computer Science Education</p> <p>Assignment: Recursion based programming to implement Fibonacci sequence or Factorial calculation.</p>
July 29, 2016	<ul style="list-style-type: none"> • Computer Science in the Classroom • Projects and Activities • Resources <ul style="list-style-type: none"> ○ CS Unplugged ○ Lynda.com ○ Computer Science Teachers Association • Support Network 		
<p>Plans for two school-year follow-up days will be determined by progress made during the summer and teacher requests.</p>			

15. If your organization plans to contract with an outside vendor/provider to provide professional development, provide the name and website URL for that vendor/provider.

The A-State Department of Computer Science does not plan to hire an outside vendor/provider to provide instruction, however, the department will be partnering with two other organizations on campus for their support and services: the College of Education and Behavioral Science Educational Renewal Zone and the School of Teacher Education and Leadership Rural STEM Education Center. The Educational Renewal Zone has already helped distribute a needs and interest survey for principals to indicate their interest in the institute. The Educational Renewal Zone has also offered to assist with recruiting teachers and purchasing USB flash drives for the participants. The Rural STEM Education Center Director has supported the Department of Computer Science with writing the grant proposal, and will continue in the role as Program Manager if the grant is awarded. Rural STEM Education Center will help recruit teachers and donate 3-ring binders to the institute.

16. Provide a schedule for the program. Be certain to include days, times, and number of hours that the sessions are to meet.

The professional development will be held at Arkansas State University in Jonesboro. The schedule for the professional development includes

- a. 10 days of face-to-face professional development; 8:30 AM -3:30 PM; June 6-10 and June 13-17, 2016.
- b. Two follow-up days at the end of July before teachers return to school and prior to the August Praxis test dates; 8:30-AM -3:30 PM
- c. Two follow-up days during the year, one prior to the November Praxis test date and one prior to the February Praxis test date; 8:30 AM-3:30 PM.
- d. Mentoring by the instructor during the academic year at a convenient time for individual teachers and instructor.

17. Provide a detailed plan to document evidence of program performance and success of the participants including all required and requested reporting.

The primary goal of the project is to provide professional development that assists 12 teachers with passing the Computer Science Praxis exam #5651. Of secondary import is for participants to learn about strategies to teach computer science and gain confidence in teaching computer science. Evidence of program performance and success of the participants will include the following:

- a. Documentation of teacher day-to-day attendance at the professional development sessions including sign-in and sign-out times
- b. Documentation of teacher success passing the Computer Science Praxis before June 1, 2017
- c. Results of pre- and post-surveys completed by teachers to determine their perceptions of changes in their computer science content knowledge, knowledge of computer science instructional strategies, and confidence in teaching computer science
- d. Results of a post-survey completed by teachers to rate their experiences with the project professional development

18. Provide the qualifications required for all staff and instructors. If a Project Manager or Director can be identified, please do so at this time.

The lead computer science instructor for the project will be Mr. Jake A. Qualls, Instructor of Computer Science at Arkansas State University. Mr. Qualls has his Master's degree in Computer Science from Arkansas State University. Mr. Qualls has taught at Arkansas State University for five years and is experienced with teaching university courses such as Computer Organization, Software Engineering, Algorithms and Advanced Data Structures, and Operating Systems. In addition, Mr. Qualls led the instruction for the 2014 Congressional App Challenge at Arkansas State University, which supported student programming teams from Northeast Arkansas schools. Mr. Qualls has also been involved with Arkansas Department of Education efforts to

develop computer science curriculum. He was a member of the ADE Curriculum Committee responsible for designing the Essentials of Computer Programming course.

Support personnel will also be hired to help the teachers during their application of the computer science content. A Teaching Assistant for the afternoon application sessions will give teachers more opportunities to work one-on-one with a content expert. The goal is to hire an undergraduate student in the Department of Computer Science who is very knowledgeable about Python, and has assisted with undergraduate computer science classes at A-State such as Concepts of Programming.

All non-instructional support work will be managed by a Project Manager, Dr. Julie R. Grady. Dr. Grady was awarded her PhD from Virginia Tech in Curriculum and Instruction. She is the Director of the Arkansas State University Rural STEM Education Center and Associate Professor in the School of Teacher Education and Leadership. During the past five years, Dr. Grady has successfully directed nine teacher professional development grants including No Child Left Behind grants administered by ADE and ADHE, three Commitment to Excellence in STEM grants administered by the Arkansas STEM Coalition, and five ADE STEM Center Mathematics and Specialists grants. **As Project Director, Dr. Grady will be responsible for teacher recruitment and registration; making arrangements for lodging and parking tags for teachers; working directly with the principals and teachers so they understand the requirements for the grant (write, send, and collect signed contracts) so there are no surprises with credit and stipends down the road; working with teachers and hotels in the area to arrange, pay for, and follow-up on lodging for the teachers who need to spend the nights in Jonesboro; collecting and documenting evidence of program performance; developing and analyzing pre- and post-surveys to document teachers' satisfaction with the instruction and workshop; preparing all needed paperwork for teachers to receive stipends: W-9 forms, ASU Vendor forms, ADE photo release forms; generating sign-in sheets for the entire workshop to document teacher attendance for the institute; attending sessions to meet teachers, be available to hear their concerns about the institute/instruction, and further build a relationship between ASU and teachers/schools so they know grant staff are available to support them throughout the year-long grant; developing and providing formative assessment questions for teachers to give feedback several times during the institute to inform instructor with ideas for improving the institute and what teachers are struggling with; completing all paperwork for teachers to receive their stipends and handle problems if stipends are not received in a timely manner; staying in touch with teachers to make sure they are aware and reminded of the schedule, that they are submitting all needed paperwork, including their Praxis results, receiving their stipends; submitting paperwork for the instructor and GA to be paid; working with Sponsored Programs to maintain all grant accounts and close out accounts when the grant ends; and providing teachers with PD**

certificates . Dr. Grady will also work with Arkansas State University’s Department of Computer Science staff and the Sponsored Programs staff to ensure spending is aligned with the approved budget, and that all necessary financial paperwork is completed for purchasing materials, paying instructors, and awarding teachers their stipends. Dr. Grady will also complete all narrative reports required by the grant and ensure that financial reports are completed by the A-State Sponsored Programs Accounting office. Since Dr. Grady is a nine-month faculty employee of Arkansas State University, a small salary is being requested in the budget so that she can contribute to the administrative aspects of the grant during her ASU non-contact time, May 15-August 15. The support provided by the Project Manager will enable the instructor to focus his time and effort on instruction.

PROGRAM BUDGET

19. Total Grant Amount Requested

\$32,957.60

20. Grant Forward Funding in Dollar Amount (maximum of 50% of total proposed grant)

\$16,478.80

21. Proposed Cost Per Participant

\$2,746.47

22. Estimated Number of Participants

Funding is being requested for an institute for 12 teachers.

23. Summary of Program’s Proposed Budget

A. Salaries	Summer Time	Participant Costs	Grant Funds
1. Jake A. Qualls, lead instructor	25 days (planning, preparation, instruction; managing administrative and financial functions) x \$231.08/day		\$5,777.00
2. Julie R. Grady, Project Director	4.7 days x \$338.06 /day		\$1,600
3. Teaching Assistant (Undergraduate student)	14 half-days= 3 hrs/day x 14 days x \$10/hr=		\$420.00
Note: Salary is only being requested for summer work. All work during 9-month, school-year contracts will be donated to the project.	TOTAL SALARY		\$7,797.00
Fringes			
1. Jake A. Qualls	17.55% x \$5,777=		\$1,013.86

2. Julie R. Grady	17.55% x \$1,600		\$280.80
3. Teaching Assistant	N/A		0
	TOTAL FRINGE		\$1,294.66
TOTAL SALARY AND FRINGE			\$9,091.66
B. Participant Costs			
1. Registration fees (June summer lunches, campus parking tags)	\$150/teacher x 12 teachers=	1,800	
2. Books			2,210.15
a. <i>Computer Science Illuminated</i> , 6th ed. (N. Dale & J. Lewis; ISBN 9781284055917; Jones & Bartlett Learning) Quote from A-State Bookstore	\$169.75/book x 12 teachers = \$2,037.00 + 8.5% taxes (\$173.15)=		1,041.60
b. <i>Guide to Teaching Computer Science An Activity-Based Approach</i> , 2nd ed. (O. Hazzan, T. Lapidot, & N. Ragonis; 2014; Hardcover ISBN 978-1-4471-6629-0) Quote from A-State Bookstore	\$80.00 x 12 teachers= \$960 + 8.5% taxes (\$81.60)=		
3. Lodging for teachers who travel more than 60 miles to attend institute (Note: teachers in the NE, NC, and Delta regions of the state travel on rural roads with restricted speed limits)	6 teachers x 14 nights x \$102/night (double occupancy)=		4,284.00
Note: <ul style="list-style-type: none"> 12 jump drives will be donated by the ASU Educational Renewal Zone. (approx. \$132) 12 3-ring binders will be donated by the ASU Rural STEM Education Center (approx. \$144) 	TOTAL PARTICIPANT COSTS	\$1,800	\$7,535.75
C. Instructor and Instructional Costs			
All instructor costs (books, mileage, phone, photocopying) and teacher parking passes will be funded by the A-State Department of Computer Science	TOTAL INSTRUCTOR AND INSTRUCTIONAL COSTS		0
Subtotal		\$1800	\$16,627.41
INDIRECT COSTS (8%)			\$1,330.19
TOTAL COSTS		\$1800	\$17,957.60

STIPENDS

24. Completer Individual Stipend Amount

\$1,250

25. Total Amount Allocated for Participant Stipends

Stipends for 12 teachers at $\$1,250 = \$15,000$