Affordable Materials Grants, Round 19:

Continuous Improvement Grants

(Spring 2021 -Spring 2022)

Proposal Form and Narrative

# Notes

* The proposal form and narrative .docx file is for offline drafting and for our review processes. Submitters must use the online Google Form for proposal submission, including uploading this document.
* The only way to submit the official proposal is through the Google Form. The link to the online application is on the [Round 19 RFP Page](https://www.affordablelearninggeorgia.org/about/rfp_r19).
* The italic text provided below is meant for clarifications and can be deleted.

The Round 18 Kickoff will include an asynchronous training module, required for all team members to complete, followed by the synchronous Kickoff Meeting on March 26, 2021 from 1pm-4pm. At least two team members from each awarded team (unless the award is for one individual) are required to attend the synchronous Kickoff Meeting.

# Applicant and Team Information

*The* ***applicant*** *is the proposed Project Lead for the grant project. The* ***submitter*** *is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant—if so, just leave the submitter blank.*

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| --- | --- |
| Requested information | Answer |
| Institution | Kennesaw State University |
| Applicant name | Yong Shi |
| Applicant email | [Yshi5@kennesaw.edu](mailto:Yshi5@kennesaw.edu) |
| Applicant position/title | Associate Professor |
| Submitter name | *The same as Above* |
| Submitter email | *The same as Above* |
| Submitter position/title | *The same as Above* |

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

|  |  |  |
| --- | --- | --- |
| Team member | Name | Email address |
| Team member 1 |  |  |
| Team member 2 |  |  |
| Team member 3 |  |  |
| Team member 4 |  |  |
| Team member 5 |  |  |

If you have any more team members to add, please enter their names and email addresses in the text box below.

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# Project Information

| Requested information | Answer |
| --- | --- |
| Type of Project | * ***Revision of open educational resources (OER) used in existing courses*** * *Creation of ancillaries for existing OER courses* * *Replacement of current OER in courses with new/better OER* * *Other* |
| Requested Amount of Funding  *$10,000 maximum total award per grant* | *$2,800* |
| Course Titles and Course Numbers | CS 4524 Cloud Computing |
| Final Semester of Project | * *Fall 2021* * ***Spring 2022*** |
| Currently Existing Resource(s) to be Revised/Ancillaries Created  *Please provide a title and web address (URL) to each of the currently existing resources that you are revising, creating new ancillary materials for, or replacing. If replacing, please include a title and web address (URL) to the new OER as well.* | http://ksuweb.kennesaw.edu/~yshi5/CloudComputing/CloudComputing.html |

# Project Goals

*In at least one paragraph, describe your project’s goals and what materials will be created or revised.*

Cloud Computing (CS4524) has been taught regularly as a major elective undergraduate course in the Department of Computer Science at Kennesaw State University over the past years. In this course, basic concepts related to cloud computing such as infrastructure as a Service (IaaS), Platform-as-a-Service (PaaS), Software as a Service (SaaS), etc. are discussed. We also study commercial products such as Amazon EC2, Google App Engine, and Microsoft Azure, as well as Cloud simulation tools and open sourced software for Cloud environment. As a fast-growing discipline, new technology and innovative research related to cloud computing are emerging every year, and we need to update the course content to prepare students better for the future job market and to meet academia demands for graduate schools.

To meet the goal of Affordable Learning Georgia for continuous improvement, the main purpose of this project is to continuously improve the course material of CS 4524, with introduction of the newest technologies and tools such as serverless web applications, AWS DynamoDB, lambda functions for cloud programming, as well as research topics such as cloud security and edge computing. Furthermore, we will also discuss more advanced cloud simulation platforms such as PureEdgeSim, CloudSimPlus and iFogSim. The PI is the coordinator of CS 4524 and has been teaching CS 4524 regularly in the Department of Computer Science at Kennesaw State University. We have already successfully designed this course as textbook-free in a project supported by ALG round 12 grant (Yong Shi is the project lead). This new project is designed to develop additional open source materials such as new content slides, new mid-term and final projects, and assignments related to new cloud computing research and technologies.

The PI will design the new content that will be mapped into the course learning outcome and consistent with the current course content. The new projects and assignments, combined with the original projects and assignments, will give students more comprehensive and deeper knowledge and experience in cloud computing, helping them become more competitive for the job market and higher education. They will also be designed with the current industrial trends in mind, to help students keep up with the fast-pace cloud computing field. We will share all the content through D2L and other open source channels.

# Action Plan

*Describe the tasks needed to complete the project in as much detail as possible. If this application has more than one team member, include the major roles for each person and which tasks this role is assigned. Estimate the amount of time (e.g. number of hours) each task will take. Include plans for open licensing and plans for making your materials accessible. Indicate if you are using other platforms in addition to the repository to host your created materials.*

Dr. Yong Shi, the principal investigator, will conduct research on new cloud technologies and development, prepare new course materials, collect and assess student performance and feedback, and write a final report.

Dr. Yong Shi will lead all the aspects of the CS4524 Cloud Computing course materials of this Continuous Improvement grant as follows:

* Conduct research in various aspects of cloud to enhance the course content:
  + Cloud simulation technologies to efficiently and effectively simulate the cloud activities in a low-to-no-cost way
  + Big Data Storage and Analytics using cloud computing architecture
  + Cryptographic security techniques to ensure the security of data and operations in Cloud
  + Load balancing algorithms and strategies to optimize the workload distribution system in Cloud
  + Mobile cloud computing technologies to enable cloud usage anywhere, anytime
  + Energy efficiency study of cloud system to reduce operational costs
  + Edge computing and fog computing to improve the processing efficiency of traditional cloud
  + Advanced technologies in cloud deployment model for handling difference user demands

*[Estimated Hours: 30 hours – March & April 2021]*

* Develop new course content, create new learning modules, design new student work:
  + Revise syllabus to add new course materials, and map them to course learning outcomes and student learning outcomes
  + Make new lecture slides to introduce new content in cloud
  + Design learning modules to contain the new content
  + Create new assignments, projects, quizzes, and exams that contain new course content. Sample of potential new projects and assignments are:
    - Cloud activities simulation in CloudSim, PureEdgeSim, CloudSimPlus and iFogSim.
    - Online Auto-Compressor and Depository using S3
    - Blood Pressure Logger on AWS
    - Random Number Generator using Lamdba
    - Calendar Application using Cloud9
    - Programming in raspberry pi for edge computing

*[Estimated Hours: 50 hours – May through August 2021]*

* Prepare for the course with integration of new course content into KSU's learning platform D2L

*[Estimated Hours: 20 hours – August 2021]*

* Create new periodic surveys during the semester, collect student feedback, and modify course content dynamically

*[Estimated Hours: 15 hours – August through December 2021]*

* Analyze and compare student performance before and after the introduction of new course content by evaluating quizzes, assignments, projects, and exams.

*[Estimated Hours: 10 hours – December 2021]*

* Analyze the student feedback by the end of semester to gain insight and understanding of students' overall opinion of the new course content

*[Estimated Hours: 5 hours – December 2021]*

* Complete the final report for this project

*[Estimated Hours: 10 hours – January – Spring2021]*

# Timeline

*Provide a project timeline aligned with the action plan above. Include major milestones and deadlines, keeping in mind your selected Final Semester.*

**Milestone\_1 – Spring 2021**

March & April 2021 : Conduct research in various aspects of cloud to enhance the course content

Milestone deliverable: Yong Shi, PI

**Milestone\_2 – Summer 2021**

May 2021 through August 2021: Revise syllabus, add new course materials, and map them to course learning outcomes and student learning outcomes

Milestone deliverable: Yong, PI

**Milestone\_3 – Fall 2021**

September-December 2021: Prepare for the course with integration of new course content into KSU's learning platform D2L, Assess student performance, Collect student feedback

Milestone deliverable: Yong Shi, PI

**Milestone\_4 – Spring 2022**

January – Spring 2021: Complete the final report for this project.

Milestone deliverable: Yong Shi, PI

# Budget

*Please enter your project’s budget below. Include personnel and projected expenses, keeping in mind that this grant funds the estimated time in your Action Plan. The maximum amounts for the award are as follows:*

* *$2,000 maximum per team member for salary, course release, travel, etc.*
* *Additional project expenses allowed, but must be adequately justified in this section*
* *$10,000 maximum total award per grant*
* **1. Personal**

Course Developer, Dr. Yong Shi, PI will receive 2021 Summer pay and/or other items below for the amount of $2,000

* **2. Other** - Travel/Equipment (conference registrations fees, raspberry pi, iPad, other computer equipment, etc.), for the amount of $800
* **3. Total $2,800**

# Creative Commons Terms

*I understand that any new materials or revisions created with Affordable Learning Georgia funding will, by default, be made available to the public under a Creative Commons Attribution License (CC-BY), with exceptions for modifications of pre-existing resources with a more restrictive license.*

# Accessibility Terms

*I understand that any new materials or revisions created with Affordable Learning Georgia funding must be developed in compliance with the specific accessibility standards defined in the* [*Request for Proposals*](https://www.affordablelearninggeorgia.org/about/rfp_r18)*.*

# Letter of Support

*The Department Chair from the corresponding project, or the Department Chair’s direct report such as the Dean or Provost, must provide a signed Letter of Support for the project. This letter should acknowledge the following:*

* *The department will provide support for fund disbursement in correspondence with the Grants/Business Office.*
* *The department approves of the work on the proposal by the applicant(s).*
* *The department acknowledges the sustainability of these affordable resources after the grant work is complete.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide a letter of support.*

*Please provide the name and title of the department chair (or other administrator) who provided you with the Letter of Support.*

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| *Coskun Cetinkaya, Chair*  *Department of Computer Science*  *Kennesaw State University* |

# Grants or Business Office Letter of Acknowledgment

*Institutional Grants/Business Offices will be responsible for fund disbursement, often in correspondence with the Department Chair, including expense and travel reimbursement. Applicants will need to provide a short Letter of Acknowledgment stating that the Grants/Business Office knows about the applicant’s intent to apply for an Affordable Materials Grant. Either the Department Chair or the Project Lead can work with the Grants/Business Office to get this signed letter.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide a letter of acknowledgment.*

*Please provide the name and title of the grants or business office representative who provided you with the Letter of Acknowledgment.*

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| *Kimberly Hunt*  *Grants and Contract Manager*  *Office of Research*  *Kennesaw State University* |