**Affordable Learning Georgia Affordable Materials Grants  
Continuous Improvement Grants Final Report**

*(or Mini-Grants, for R17 and earlier)*

# General Information

Date: 12/13/2023

Grant Round: Round 22

Grant Number: M209

Institution Name(s): Kennesaw State University

Team Members (Name, Title, Department, Institutions if different, and email address for each):

* Shirley Tian, Associate Professor, Information Technology, [xtian2@kennesaw.edu](mailto:xtian2@kennesaw.edu)
* Ying Xie, Professor, Information Technology, [yxie2@kennesaw.edu](mailto:yxie2@kennesaw.edu)
* Linh Le, Assistant Professor, Information Technology, [lle13@kennesaw.edu](mailto:lle13@kennesaw.edu)
* Jamie Jamison, Lecturer, Information Technology, [jjamiso9@kennesaw.edu](mailto:jjamiso9@kennesaw.edu)
* Darin Morrow, Senior Lecturer, [dmorrow21@kennesaw.edu](mailto:dmorrow21@kennesaw.edu)

Project Lead: Shirley Tian

Course Name(s) and Course Numbers:

* CSE 4973 Tech Innovation and Entrepreneurship
* IT 4863 Web and Mobile Application Security
* IT 4883 Infrastructure Defense
* IT 4773 Machine Learning for Enterprise Applications

Final Semester of Project: 2023 Fall

***If applicable to your project:***

Average Number of Students Per Course Section: 35

Number of Course Sections Affected by Implementation of Revised Resources: 6

Total Number of Students Affected by Implementation of Revised Resources: 210

# Project Narrative

*Describe the course of your revision or ancillary creation project, including*

* *A summary of your project’s purpose, plan, and timeline.*
* *The original works which were revised or added to, with links. For example, if you revised an open textbook, give the title, author, and link.*
* *A narrative description of how the project’s plan was carried out.*
* *Lessons learned, including anything you would do differently next time.*

The Department of Information Technology at Kennesaw State University (KSU) has made department-wide efforts to adopt open educational resources (OER) in both undergraduate and graduate courses and housing both Z-Degrees since 2020. Thanks to strong support from Affordable Learning Georgia (ALG), all the courses from the BSIT program have now replaced their textbooks with no-cost-to-student OER learning materials. Information technology is an ever-changing field; it is very important to keep our courses updated. The degree program periodically undergoes curriculum revision every three years. Out of this, we updated three courses and develop one new course. Many of them were updated more than two years ago and needed to be aligned with current industry best practices and trends as follows:

* CSE 4973 Tech Innovation and Entrepreneurship
* IT 4863 Web and Mobile Application Security
* IT 4883 Infrastructure Defense
* IT 4773 Machine Learning for Enterprise Applications

As part of our department ALG strategic plan, we propose to create OER materials for these five courses to keep up the BSIT Z-Degree. Our assigned faculty to develop these courses have already identified the preliminary sources based on the learning objectives for developing OER materials. We are striving to make OER resources accessible to all students, as a result, further effort is needed to make developed slides, lectures, test questions compliant with accessibility criteria enforced by Digital Learning Innovation at KSU. The overall goals of our project are listed as follows. The specific plan about each individual course is illustrated in the action plan section.

* Develop new OER materials for courses to be part of BSIT Z Degree
* Ensure all developed OER materials are free from any accessibility issues;
* Develop new OER materials based on course learning outcomes;
* Develop new ancillary material such as assignments and lab material;
* Use a department provided layout template to make sure OER material in each course has similar look and feel;
* Ensure all course materials including lectures, slides, resources comply with the specific accessibility standards defined by ALG;

Create a course package that can be imported into D2L Brightspace, the course management system used by the University System of Georgia.

*The original works which were revised or added to, with links are:*

CSE 4973 Tech Innovation and Entrepreneurship (new course)

[IT 4863 Web and Mobile Application Security](https://kennesawedu-my.sharepoint.com/:u:/r/personal/xtian2_kennesaw_edu/Documents/2022%20Fall%20ALG%20R22/D2LExport_2395371_CO.430.IT4863.81956.20222_2022102513.zip?csf=1&web=1&e=beMy6X)

[IT 4883 Infrastructure Defense](https://kennesawedu-my.sharepoint.com/:u:/r/personal/xtian2_kennesaw_edu/Documents/2022%20Fall%20ALG%20R22/D2LExport_2510829_CO.430.IT4883.12901.20224_2022102536.zip?csf=1&web=1&e=eUqxM1)

[IT 4773 Machine Learning for Enterprise Applications](https://kennesawedu-my.sharepoint.com/:u:/r/personal/xtian2_kennesaw_edu/Documents/2022%20Fall%20ALG%20R22/D2LExport_1909115_IT4773MachineLearningforEnterpriseApplications_2022102559.zip?csf=1&web=1&e=rtXwUM)

In the section, we first describe the overall project timeline. The timeline for each proposed course is listed separately.

1. *Timeline for CSE 4973–* CSE 4973 Tech Innovation and Entrepreneurship

*Responsible personal: Dr. Ying Xie*

* 1. *01/01/2023*. Complete the development of the first half of the lectures
  2. *02/15/2023*. Complete the development of the second half of the lectures
  3. 03/01/2023. Complete the development of the course projects and all OER ancillary materials, such as quizzes, discussions, assignments.
  4. *04/01/2023*. Develop the public course website and make sure all OER materials are accessibility compliant.
  5. 05/01/2023 Complete student review of the OER material; develop an online survey instrument for collecting students’ feedback after courses are taught using updated OER material; and develop the project progress report.
  6. *12/15/2023*. Complete course offerings with updated OER material; complete the course survey on updated OER material; and compile and submit the final project report.

1. *Timeline for* IT 4773*–* IT 4773 Machine Learning for Enterprise Applications

*Responsible personnel: Dr. Linh Le*

1. 1/31/2023. Complete accessibility training hosted by instructional designer, Garima Banerjee.
2. *3/31/2023*. a) Complete the migration of all materials from Microsoft Azure to open-source tools. The updates to each module include learning material, PowerPoints slides, test banks, case studies, assignments, new study guides, and teaching notes. b) Make the OER material in those learning modules comply with the accessibility requirements set by ALG.
3. *4/30/2023*. Update materials on enterprise applications of machine learning. The updates to each module include learning material, PowerPoints slides, test banks, case studies, assignments, new study guides, and teaching notes.
4. *5/31/2023*. Revise all materials for ADA compliant and error links or resources.
5. *12/12/2023*. a). Complete IT 4733 course offering with update OER material. b). Collect students’ feedback on updated OER material; c). Host the OER material in a publicly available website and create a course package that can be imported into D2L.
6. *Timeline for* IT 4863*–* IT 4863 Web and Mobile Application Security

*Responsible personnel: Professor Jamie Jamison*

1. *1/31/2023*. Complete accessibility training and review of existing OER material
2. *3/31/2023*.
   1. Complete the development of accessibility compliant OER material
   2. Complete expanding modules 1-7.
3. *6/30/2023*.
   1. Complete the development of accessibility compliant OER ancillary material such as quizzes, test banks, and assignment;
   2. Develop survey instruments for collecting students’ feedback after courses are taught using updated OER material;
   3. Conduct student review of the OER material;
   4. Improve the course materials based on the feedback received.
4. *12/15/2023*.
   1. Complete course offerings with updated OER material.
   2. Collect students’ feedback on the course.
   3. publish the updated OER material on a public website and create a course package that can be imported into D2L.

1. *Timeline for* IT 4883*–* IT 4883 Infrastructure Defense

*Responsible personnel: Professor Darin Morrow*

1. *1/31/2023*. Complete accessibility training and review of existing OER material.
2. *3/31/2023*. a) Complete the development of accessibility compliant OER material; b) Complete the project progress report.
3. *6/30/2023*. a). Complete the development of accessibility compliant OER ancillary material such as quizzes, test banks, assignments, and/or labs; b) Complete student review of the OER material; c). Develop survey instruments for collecting students’ feedback after courses are taught using updated OER material; d) Complete the project progress report.
4. *12/15/2023* a). Complete course offerings with updated OER material. b). Complete the course survey on updated OER material; c). Publish the updated OER material in a public website and create a course package that can be imported into D2L. d). Compile and submit the final project report.

# Materials Description

*Describe all the materials you have created or revised as part of this project. These descriptions may be used in the* [OpenALG](https://alg.manifoldapp.org/) *repository description field. Include the* [*open license your materials will be shared under*](https://creativecommons.org/share-your-work/)*—for most materials, this will be an Attribution 4.0 License (CC BY) as required in the Grants Request for Proposals.*

Dr. Shirley Tian, who has participated in several ALG grants from previous rounds, will coordinate the activities in this project to ensure its successful completion. She is also the program coordinator of BSIT (Bachelor of Science in Information Technology). The activities include making a project plan once funded, monitoring project progress, coordinating with the university grant office on project budget and expense, facilitating coordination among faculty developers, instructional designer, and student, collecting students’ feedback on the updated OER material and writing semester status report and final report. Dr. Tian is estimated to work 20 hours as a project lead.

IT 4773 covers enterprise applications of machine learning on data analytics. Topics span the complete life cycle of data analytics from envisioning the problem, identifying proper data, selecting suitable machine learning methods, evaluating modeling performance, and deploying the results to improve decision-making. Students begin by learning the basic concept of machine learning and the machine learning platform Microsoft Azure. Students then get introduced to a complete end-to-end machine learning project to gain an overall understanding of the process. Then, students learn about the different tasks in more detail, including supervised/unsupervised learning and the different models for each task and how to use them. Finally, students are introduced to practical enterprise applications of machine learning.

This course provides an overview of the infrastructure assessment and penetration testing process and the processes and techniques for improving the defensibility of that infrastructure.

In this continuous-improvement ALG project, we propose to update the no cost, OER learning material by updating modules 4 (Penetration Testing), module 8 (Log Analytics) and module 9 (Social Engineering). All these tasks will be performed to improve accessibility, enhance the learning experience, and update the course to include the latest OERs to further benefit our students. Some of the planned activities include the following:

* + - Update the lecture materials and modules for accessibility as well as provide current content available online.
    - Update the content and assignments related to Penetration Testing to enhance with the latest guidance from the Nation Institute of Standards and Technology (NIST) Technical Guide to Information Security Testing and Assessment. <https://www.govinfo.gov/content/pkg/GOVPUB-C13-894df23cbad6ad74af7d49c17b081dd1/pdf/GOVPUB-C13-894df23cbad6ad74af7d49c17b081dd1.pdf>
    - Update and enhance the content, and assignments related to Log Analytics to include Security Incident and Event Management (SIEM). Also include the lates from the NIST Guide to Computer Security Log Management <https://www.govinfo.gov/content/pkg/GOVPUB-C13-52c3b5520393598b18782a7b55fde7e6/pdf/GOVPUB-C13-52c3b5520393598b18782a7b55fde7e6.pdf>
    - Enhance the human aspects related to social engineering and how businesses and technology can better understand and prepare. Reference the International Organization for Standardization <https://www.iosrjournals.org/iosr-jce/papers/Vol18-issue5/Version-5/O18050594100.pdf>

This course was lastly updated in ALG Round 16. An issue with the current course is the use of Microsoft Azure as the main tool. Microsoft Azure is a commercial machine learning platform using a monthly subscription model. The trial version of Microsoft Azure is limited in both functionality and time. Consequently, it is difficult for students to fully use Microsoft Azure in a duration of 15 weeks without exceeding the cost-free threshold. This course will be revised and migrated to a different and fully free platform to address the issue. Specifically, the main tool used in the course will be Python (<https://www.python.org/>), Jupyter Notebook (<https://jupyter.org/>), and related open-source libraries. The working environments include the students’ personal computers for small tasks, and in the College of Computing and Software Engineering high performance-computing cluster for tasks that are more computationally intensive. Additionally, all related materials (including but not limited to reading materials, links, tutorials, assignments, quizzes, exams) that are related to Microsoft Azure will be updated to match the new tools. Furthermore, materials on enterprise applications of machine learning will be updated to be closer to current and state-of-the-art technologies. Additionally, all remaining materials will be revised to ensure that they are up to date and satisfy any compliant.

# Materials Links

*If you are hosting your materials in places other than OpenALG, please provide these links in this section. Otherwise, leave blank. Note: we cannot access D2L or Canvas links.*

[***CSE 4983***](https://kennesawedu.sharepoint.com/:u:/r/sites/CCSE/IT/Documents/Courses-related/ALG/ALG%20course%20packages/ALG%20Round%2022%20Undergraduate%20Courses/CSE4983_R22_YX.zip?csf=1&web=1&e=37FA85)

[***IT 4773***](https://kennesawedu.sharepoint.com/:u:/r/sites/CCSE/IT/Documents/Courses-related/ALG/ALG%20course%20packages/ALG%20Round%2022%20Undergraduate%20Courses/IT%204773.zip?csf=1&web=1&e=QVDRtK)

[***IT 4863***](https://kennesawedu.sharepoint.com/:u:/r/sites/CCSE/IT/Documents/Courses-related/ALG/ALG%20course%20packages/ALG%20Round%2022%20Undergraduate%20Courses/IT%204773.zip?csf=1&web=1&e=QVDRtK)

[***IT 4883***](https://kennesawedu.sharepoint.com/:u:/r/sites/CCSE/IT/Documents/Courses-related/ALG/ALG%20course%20packages/ALG%20Round%2022%20Undergraduate%20Courses/IT%204773.zip?csf=1&web=1&e=QVDRtK)

# Future Plans

* *Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.*
* *Describe any plans to revise or add to these materials in the future.*

This project will be used to conduct the further research on ALG Round 24 research project.

We plan to revise and revisit the course materials after 2-3 years.