Affordable Materials Grants, Round 18:

Continuous Improvement Grants

(Fall 2020 – Fall 2021)

Proposal Form and Narrative

# Applicant and Team Information

|  |  |
| --- | --- |
| Requested information | Answer |
| Institution | Georgia Gwinnett College |
| Applicant name | Anca Doloc Mihu |
| Applicant email | adolocmihu@ggc.edu |
| Applicant position/title | Assistant Professor of Information Technology |
| Submitter name | Cathy Hakes |
| Submitter email | chakes@ggc.edu |
| Submitter position/title | Executive Director, Office of Research, Sponsored Programs, and Accreditation |

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 | Anca Doloc Mihu | adolocmihu@ggc.edu |
| Team member 2 | Cengiz Gunay | cgunay@ggc.edu |
| Team member 3 | Chris Robinson | crobinson@ggc.edu |
| Team member 4 | Charles H. Leggett | Cleggett1@ggc.edu |
| Team member 5 |  |  |

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

|  |
| --- |
|  |

**PROJECT TITLE:** Ancillary Materials for theAgile Software Development Practicum Textbook

# Project Information

| Requested information | Answer |
| --- | --- |
| Priority Category / Categories | *Priority categories:*   * *Collaborative Projects with Professional Support* * *Student Participation in Materials Evaluation and/or Development* |
| Requested Total Amount of Funding | *$9,594* |
| Final Semester of Project | *Fall 2021* |
| Using OpenStax Textbook? | *No* |
| Requested Information |  |

# Impact Data

Please fill in the data below with impact data in below with *one course taught by one instructor* in each table, and only include courses and instructors that are specifically part of the scope of this grant proposal. Add or remove tables as needed. **Please only put a single averaged or totaled (as appropriate) number in each box. Do not put ranges or mathematical equations in any of these boxes.**

## Course 1

| Row # | Requested information | Answer |
| --- | --- | --- |
| N/A | Course title and number | ITEC-3870 Software Development II |
| N/A | Course instructor | Anca Doloc Mihu |
| 1 | Average number of students enrolled per section | 17 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 68 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | **Required Textbook:**  Software Engineering: A Practitioner's Approach, 8th Edition by Roger S Pressman and Bruce Maxim [1].  <https://www.barnesandnoble.com/w/software-engineering-pressman/1118592642> ($156)  **Suggested Readings:**  Steve McConnell “Code Complete: A Practical Handbook of Software Construction” 2nd Edition [2], ($55)  Robert C. Martin “Clean Code: A Handbook of Agile Software Craftsmanship” 1st Edition [3] ($50)  Simon Holmes “Getting MEAN with Mongo, Express, Angular, and Node” 1st Edition [7] ($45) |
| 8 | Original cost per student section enrollment  *Add up the cost of all materials in row 7.* | $306 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $306 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $20,808 |

## Course 2

| Row # | Requested information | Answer |
| --- | --- | --- |
| N/A | Course title and number | ITEC-3870 Software Development II |
| N/A | Course instructor | Cengiz Gunay |
| 1 | Average number of students enrolled per section | 17 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 68 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | **Required Textbook:**  Software Engineering: A Practitioner's Approach, 8th Edition by Roger S Pressman and Bruce Maxim [1].  <https://www.barnesandnoble.com/w/software-engineering-pressman/1118592642> ($156)  **Suggested Readings:**  Steve McConnell “Code Complete: A Practical Handbook of Software Construction” 2nd Edition [2], ($55)  Robert C. Martin “Clean Code: A Handbook of Agile Software Craftsmanship” 1st Edition [3] ($50)  Simon Holmes “Getting MEAN with Mongo, Express, Angular, and Node” 1st Edition [7] ($45) |
| 8 | Original cost per student section enrollment  *Add up the cost of all materials in row 7.* | $306 |
| 9 | Average post-project cost per student section enrollment | $0 |
| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $306 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $20,808 |

**1. PROJECT GOALS**

The project team received ALG funding to transform their ITEC 3870 textbook into OER materials, which will end Fall 2020. The proposed continuous improvement grant introduces substantial improvements with its overarching goals to create new ancillary materials that include student and the Library input, accessibility, and incorporate 12 hands-on workshops to drill in the concepts and skills learned in the classroom.

This ancillary materials project is especially important because our Software Development track was approved on 9/29/2020 by Southern Association of Colleges and Schools (SACSCOC), becoming GGC’s first accredited SACSCOC *distance learning* major. Online distance learning courses (including ITEC 3870) will start before summer of 2021, which matches perfectly with the timeline of this project. Thus, we will be using the transformed textbook and these additional proposed ancillary materials for use in the online distance learning courses.

**Goals. The goals of the project are:**

1. **Incorporate new important/ crucial materials into the Agile Software Development Practicum Textbook that will improve their accuracy and design**.
   1. **A new chapter on Programming for Software Security.** A recent publication from the National Institute of Standards and Technology warned that critical infrastructure ofUnited States is susceptible to cybersecurity threats [20]. Part of this risk comes software systems that have vulnerabilities and flaws that can be exploited by attackers [21]. With the explosive growth seen in the software industry, proper education of security as part of a software development curriculum becomes critical. Usually, cybersecurity education is provided as a separate major. However, a prior discussion with Mr. Charles Leggett, Director of Information Security at GGC, resulted in finding out that a major problem with security in software systems is caused by the lack of knowledge of the new junior hires, which are software development majors students potentially from our program and have taken the Software Development 2 course. Currently such a chapter does not exist in our textbook, and the course does not offer this subject. We plan to incorporate this content for our Software Development 2 students to prepare them better for the job market in the field. The chapter will follow the Open Web Application Security Project (OWASP) web application security recommendations [19] and provide hands-on activities.
   2. **Add hands-on software workshops (12 in total) to the textbook.** This need is based on team member’s observation from using the previously created textbook materials in the class. Although the students were very engaged with the coding concepts in the textbook, they could not grasp its practical application by integrating several pieces of code introduced to them on the respective subject. As anecdote, one semester a student offered to present a demonstration of a software instead of a typical article presentation. The demo was based on the material presented in the textbook with mini code excerpts, but put together into a very simple real-world application. The result transformed the entire class into a workshop where everyone was coding and trying to understand why and where code goes. This fortified our view that the heavy programming concepts should be put into real-world applications at the beginner and intermediate levels of difficulty and presented to students via hands-on workshops rather than just via simple exercises.
2. **Create materials that are accessible for impaired individuals.** We plan to work with Chris Robinson, Technical Trainer/Writer, User Support Services, GGC to make all new materials accessible for the impaired. Slide presentations will incorporate accessible design, images will include descriptive captions, and workshops will includes videos with accurate captioning.

We will reuse the same free and open hosting mechanism for the OER materials that we are extending, which is based on the web publishing system Hugo and the slide presentation system Reveal.JS. Both provide materials as open and native browser content without obfuscating them in proprietary formats, such as PDF or PPTX. Reveal.JS is also compatible with screen readers, making it friendly for the visually impaired [22]. There are additional Reveal.JS plug in software that we could utilize to improve accessibility [23].

1. **Create materials that will enhance student success.**
2. Improve student success in the upper level Software Development track courses by creating on-line, customized, and organized course materials focused on up-to-date software development industry practices.
3. Improve student outcomes oriented towards the Software Development job market by designing course materials customized around a real-world client-based project to provide students with practice.
4. Eliminate student expenses in textbook purchases. New added materials will come to a cost of $0 for students.
5. Share the learning materials with other USG campuses to benefit more students.
6. **Collaborate with people outside the Software Development program to improve the quality and clarity of the content delivered on the textbook to better fit the students’ needs in terms of accessibility of content and of the delivery of important topics in the industry.**
7. **Include students in the materials evaluation and development process.** We plan to include 3-6 students into the process of testing and then adjusting these materials to better fit our student’s needs. We seek 1-2 students from the English department for help with accessibility materials and overall features on the text. We also seek 2-4 students that have taken the course to help us adjust the materials concepts.

**Deliverables: The deliverables of this project are:**

1. New Chapter on Programming for Software Security – chapter will include lecture slides as study materials, class activities, tutorials/video clips for each topic, practice exercises, quizzes, and corresponding gradebook components.
2. New hands-on software workshops (12 of them) for several topics:
   1. Github – beginner and intermediate
   2. Jira – beginner
   3. Firebase
   4. Ionic
   5. Angular – beginner and intermediate
   6. React – beginner
   7. Vue – beginner
   8. JSON – beginner
   9. Cloud services set up (AWS, Heroku)

Included are slides and videos showing how to do all the coding tasks (from the beginning to the end, including explanations on the connecting parts) for a real-world application.

1. Textbook website will be updated to include all the proposed materials.
2. A final report. All materials will be surveyed by Software Development II course students, the surveys will be analyzed and results will be reported in the final report to ALG.

**2. ACTION PLAN**

**A. Detailed Task Description**

Tasks details to complete this project grouped per each new item that will be included in the textbook:

**Tasks related to the building the new Chapter on Programming for Software Security:**

1. Select and develop study material for the new chapter materials will be performed by Dr. Gunay for ~80 h.
2. Build up practice exercises, assignments, and quizzes for the new chapter will be performed by Dr. Doloc-Mihu for ~ 40 h.
3. Complete and analyze all grade/survey related data for the new chapter of the course will be performed by Dr. Doloc-Mihu for ~20 h.
4. Work with C. Leggett to get his feedback on the new chapter materials and then adjust materials accordingly will be performed by Dr. Doloc-Mihu for ~14 h. 6 hour work face-to-face and 8 hours to incorporate feedback.
5. Work with Chris Robinson to learn and understand how to build accessibility materials will be performed by Dr. Doloc-Mihu for ~10 h. 2 h work face-to-face and 8 hours to incorporate feedback.
6. Work with student assistant(s) to test and adjust materials for better fit for students needs will be performed by Dr. Gunay for ~16 h. 6 h work face-to-face and 10 hours to incorporate feedback.
7. Help team learn accessibility materials will be performed by Mrs. Chris Robinson for 6 h work face-to-face and 4 h review materials.
8. Review new chapter materials on the security topic will be performed by Dr. Charles Leggett for 10 h including meetings.
9. Test and review materials will be performed by student assistants for ~10 h.

**Tasks related to building the new hands-on software workshops:**

1. Build up slide materials
2. Test software
3. Add hints and tricks for students to improve software development
4. Prepare potential problems with the software like running it on different platforms (Linux, Windows, Mac), and on different browsers other than Chrome, etc.

***Textbook-related Workshop Topics:***

Topic: Version Control

Github Workshops

* Beginner - Example of OER assignments we plan to transform into workshops: <https://gist.github.com/cengique/4841d45546b1f5ab74ed0e804b311b11> <https://gist.github.com/cengique/41ab5ce6cc881262e5e50e4b66144235>
  + Intermediate

Topic: Project Management with Jira

Jira Workshop – Beginner - Example of OER assignment

<https://gist.github.com/cengique/31661d3323273754fce83cae8bab558a>

Topic: Full-stack Architecture focusing on JavaScript libraries and frameworks

Angular Workshops (Beginner and Intermediate)

React Workshop (Beginner)

Vue Workshop (Beginner)

Ionic Workshop - Example OER slides that we developed:

<https://docs.google.com/presentation/d/1SXlu7zvpd6HP5od_2EZDsJ-AN2AQR7uIy3yX3kYALes/edit#slide=id.p>

Topic: NoSQL databases

JSON Workshop – Beginner

Firebase Workshop - Example OER included in Ionic workshop slides above

Topic: Advanced Web-app concepts

Heroku Workshop

AWS Workshop

Note that, although this undertaking might seem overambitious, the authors have already tested some ideas on these workshops. This work will be entirely done during the summer, when authors are not involved in any teaching duties.

**Other project tasks:**

1. Tasks related to materials being made accessible for impaired. Tasks involve working with Chris Robinson to get feedback on the materials and then adjust these materials accordingly - will be performed by Dr. Doloc-Mihu, with an estimation of 6 hour work with collaborator and 40 hours to incorporate feedback, for a total of 46 h.
2. Tasks related to the IRB application to collect the survey and archival grade data – will be performed by Dr. Doloc-Mihu, with an estimation of 5 h.
3. Tasks related to setting up and maintaining the proposed gradebook template (compatible with D2L) for the new materials – will be performed by Dr. Doloc-Mihu, with an estimation of 5 h.
4. Tasks related to completion of final report - will be performed by Dr. Doloc-Mihu, with an estimation of 10 h.
5. Tasks related to involving students to test the new materials (finding students for focus group, complete paperwork for student payments, collect detailed feedback from students, adjust new materials to incorporate their feedback) - will be performed by Dr. Gunay (70%) and Dr. Doloc-Mihu (30%), with an estimation of 10 h per student, and potential of 40 h (if maximum 4 students are involved).
6. Tasks related to working with student(s) assistant to adjust the materials tested and potentially bring in new features - will be performed by Dr. Gunay (70%) and Dr. Doloc-Mihu (30%), with an estimation of 40 h per student, and potential of 80 h (if maximum 2 students are involved).
7. Tasks related to setting up and maintain the accessibility of new course materials on the web - will be performed by Dr. Gunay, with an estimation of 40 h.
8. Tasks related to testing all materials to include up-to-date software content - will be performed by Dr. Gunay, with an estimation of 20 h.
9. Tasks related to leading the project building materials process - will be performed by Dr. Doloc-Mihu, with an estimation of 5 - 10 h.

**B. Role of Each Team Member**

Each team member will have full control over their own modules, but will collaborate to create coherent course contents.

**Dr. Anca Doloc-Mihu** as principal investigator will

* Build up practice exercises, assignments, and quizzes for the new chapter
* Develop all materials for the following hands-on workshops:
  + Github,
  + Jira,
  + Angular,
  + JSON
* Complete and analyze all grade/survey related data for the new chapter of the course
* Submit an IRB application to collect the survey and archival grade data
* Set up and maintain the proposed gradebook template (compatible with D2L) for the new materials
* Contact collaborators to get their feedback on the materials and will adjust materials accordingly
* Work with student assistants to test, adjust materials, and potentially bring in new features for better fit for students needs
* Complete final report
* Oversee the entire continuation process
* Lead the process of development of custom course materials.

**Dr. Cengiz Gunay** as Co-PI will

* Lead the evaluation effort for this project
* Select and develop study material for the new chapter materials
* Develop all materials for the following hands-on workshops:
  + Firebase,
  + Ionic,
  + React,
  + Vue,
  + Cloud services workshops (AWS, Heroku)
* Seek and involve a student focus group to test the materials
* Work with student assistants to test, adjust materials, and potentially bring in new features for better fit for students needs
* Set up and maintain the website course materials
* Test all materials to include up-to-date software content.

**Mrs. Chris Robinson** as team collaborator will

* Help content creators learn how to build in accessibility during Spring 2021
* Check the new materials to make sure they include the necessary accessibility features
* Provide advice regarding the new materials adjustments for accessibility

**Dr. Charles Leggett** as team collaborator will

* Help team in a consulting role while we add the new security chapter to the book
* Review and provide feedback regarding the new chapter materials

**Student Research Assistants**

We will have two types of Student Assistants:

* Student Assistants that will
  + test, provide feedback, and potentially help team bring in new features for the new materials.
  + test the final materials to be correctly incorporated onto the textbook and on the website.
* Students Testers that will
  + test and provide feedback to the team on the new workshops.

**C. Plans for open licensing materials**

Our textbook is under the Creative Commons license. In this project, we aim to create the materials for GGC students and post them online for anyone to view following the textbook format. We will use the textbook platform to establish free publicly available materials for anyone inside or outside GGC. We plan to present our newly developed course materials at local and national conferences.

**D. Plans for making materials accessible.**

All new materials will be adjusted for full accessibility standards according to the following plan:

1. End of Spring 2021. Make all materials of the new chapter accessible for those visually and hearing impaired.
2. End of Summer 2021. Make all workshop materials Including slides and videos) accessible for those visually and hearing impaired.
3. Collaborate with Chris Robinson to double check all materials for accessibility and adjust them accordingly for final posting on the textbook.

All revised or newly created materials will be developed with basic accessibility standards and in consultation with the GGC library liaison and other pertinent GGC unit/s. As per the ALG RFP, our materials will take into consideration the following:

* 1. [Accessible document design](https://affordablelearninggeorgia.org/documents/OERAccessibility_DocDesign.pdf)
  2. Either [descriptive alternative text](https://affordablelearninggeorgia.org/documents/OERAccessibility_AltText.pdf) OR descriptive figure captions on all images
  3. [Accurate captioning on all videos and transcripts on all audio](https://affordablelearninggeorgia.org/documents/OERAccessibility_Captioning_Transcripts.pdf)
  4. [Accessible PowerPoint design](https://affordablelearninggeorgia.org/documents/OERAccessibility_PowerPoint.pdf)

**E. Platforms that will be used in addition to the ALG repository.**

We will be using our previous textbook platform (Github.com), which is an open and freely available portal, such that students and faculty from the entire USG system and outside will have free access to materials any time. We will put links to all our materials on GGC’s D2L website, but we will not lock it into D2L because we want to make it truly available to everyone, and not just to GGC community. All students who take this course will have free access to the materials on the first day of class and throughout life.

This website will be used to post all the course materials, announcements, assignments, and instruct students were to submit their homework. No grades or student information will be posted on the website. Students will take tests and quizzes on GGC’s D2L, where they will have their grades posted privately. Instructor materials will be posted on a locked resource and instructors will be given the opportunity to request access through simple email exchange and vetting process with the PIs.

As with the textbook format, we will recommend various online software development services for students to post their products for homework and projects (since D2L does not provide this function). Note that students can register for free accounts on these web sites (e.g., JIRA, GitHub, Piazza, Reddit, etc.).

We plan to submit an IRB application to collect a survey and archival grade data. The survey will be used to collect feedback for the newly added chapter, and for each newly created workshop. Questionnaires will be administered using a surveying tool approved by the IRB committee at GGC (GGC Qualtrics). Data analysis will be done via Excel sheets. We plan to use the same questions as the ones used to survey the textbook.

**F. Evaluation Measures**

**Qualitative Measure, Methods, and Tools**

Open-ended questions will be asked:

* How can we improve the new course material?
* What would be one thing that can be added to the course material?
* Other comments or suggestions about this course?
* How did the availability of no-cost online textbook and materials help improve your learning?

**Quantitative Measure, Methods, and Tools**

We will administer a student survey that will assess students’ responses (Strongly disagree/ Agree) on the following statements.

* The materials clearly explained concepts. The materials are useful to learn the concepts.
* The materials include enough exercises and examples to help me learn the concepts.

We will collect data on course success as required by ALG instructions and compare it to previous data from the course to check for improvements in the following:

* Retention rate in the course
* Passing and failing rate
* Drop and withdraw rate
* Percentage of students getting As, Bs, Cs, Ds, Fs, and
* Percentage of students achieving student learning outcomes.

**3. TIMELINE**

Full implementation will begin **Spring 2021** semester.

**Fall 2020 (starting after the Kickoff meeting - October)**

Start planning modules; research and purchase hardware and software as dictated by project needs; and recruit potential student assistants and testers (create and post the job announcement).

**Spring 2021**

Start drafting modules for the new Chapter on Programming for Software Security. These include all reading materials, lecture notes, video clips, exercises, labs, and assignments.

* Collaborate with Charles Leggett to refine the new chapter reading materials, lecture notes, video clips, and exercises.
* Collaborate with Chris Robinson and learn how to build in accessibility.
* Make all chapter materials accessible for those visually and hearing impaired.
* Finalize all chapter materials according to feedback from both collaborators and students assistants.
* Add chapter and all materials to the textbook.

**Summer 2021**

(No teaching assignments – focus on ALG)

ITEC 3870 (Software Development II) is not taught during the summer term at GGC.

* Start drafting the newhands-on activities/workshops for all proposed topics. These include all hands-on materials, video clips, and exercises.
* Revise surveys.
* Finalize all hands-on materials and make them accessible for those visually and hearing impaired.
* Students test the new chapter and the hands-on activities/workshops.
* Add all hands-on materials to the textbook.

**Fall 2021**

* Collect feedback from students testing the new materials and adjust the textbook accordingly. Determine the efficacy of the materials (hardware and software) that were purchased for this project.
* Collaborate with Chris Robinson to revise and finalize all new materials as accessible for those visually and hearing impaired.
* Pilot at both course sections of ITEC 3870 SD II.
* Administer and collect semester evaluation. Administer the evaluation and collect feedback from all the team members on the strengths and weaknesses of the project materials and any future improvements.
* Analyze all collected data, and complete this task by November 25, 2021.
* Prepare final report and submit by December 15, 2021.

**4. BUDGET**

Amount requested: $9,594

Justification:

**A. PERSONNEL: $8,594**

Funds are requested to cover the compensation and fringe (FICA/SS, FICA Med, and Retirement) of Drs. Anca Doloc-Mihu and Cengiz Gunay at $2,000 each.

* Dr. Anca Doloc-Mihu will serve as project manager. She will build up practice exercises, assignments, quizzes for the new chapter, develop all hands-on for the Github, Jira, Angular, and JSON activities/workshops, complete and analyze all grade/survey related data for the course. She will submit an IRB application to collect the survey and archival grade data. She will contact both collaborators to get their feedback on the materials and will adjust materials accordingly. In addition, she will set up and maintain the proposed gradebook template (compatible with D2L) for the new materials, and complete final report. The requested pay will cover base pay and fringe benefit.

In addition to the request for pay, we request $150 to cover part of the registration fees for the conference. This will be part of the $2,000.

* Dr. Cengiz Gunay will lead the evaluation effort for this project. He will select and develop study material for the new chapter materials, develop all hands-on for the Firebase, Ionic, React, Vue, and Cloud services activities/workshops, seek and involve students to test the materials. In addition, he will set up and maintain the website course materials. The requested pay will cover base pay and fringe benefit.

In addition to the request for pay, we request $150 to cover part of the registration fees for the conference. This will be part of the $2,000.

* Student Research Assistants

The Project will hire students to test new materials before distributing them to the classrooms, and would like to compensate these students for their time. There are two categories of students:

* Student Assistants:

Per Student Pay: Each student will be paid $8.25 X 10 hours per week = $82.5 per week. Summer Pay will be 8 weeks x $82.5 = $660. Fall Pay will be 12 weeks x $82.5 = $990. That is a total per student of $ 1,650.

Per Student Travel: Registration fee of $150. Travel lodging: $ 200.

Per Student Total Pay (pay + travel): $2,000

A total of $4,000 will be paid to the two students assistants who will be involved in the project through summer and fall.

* Students Test Assistants:

Per Student Pay: Each student will be paid $8.25 X 12 hours per week = $99 per week. We anticipate a week of work per workshop testing process, so total of 6 students x $99 each student = $594.

A total of $594 will be paid to the six students assistants who will be involved in testing the project through summer and fall.

Mrs. Christine Robinson and Mr. Charles H. Leggett will be providing their assistance as a service to the institution as per institutional guidelines.

**B. OTHER DIRECT COSTS: $1,000**

Hardware: $1,000. We would like to purchase

1. Hard drive that will allow us to store all the textbook materials including the videos for the accessibility which require very large storage space. The hard drives will be used by PIs to store and backup (2nd hard drive) the video materials for the hands on workshops.
   * + WD 5TB My Passport Portable External Hard Drive, Black – WDBPKJ0050BBK-WESN, 2 units at $125.56, totaling at $251.12
   1. Professional recording devices (like camera and mics). Cameras and microphones will be used by PIs to record lecture module and workshop videos.
      * Logitech BRIO Ultra HD Webcam for Video Conferencing, Recording, and Streaming – Black, 2 units at $223.50, totaling $447.00
      * Microphone Stand, Magicfun Mic arm Desk Adjustable Suspension Boom Scissor for Blue Yeti Snowball & Other Mics for Professional Streaming, Voice-Over, Recording, Games, 2 units at $21.99, totaling $43.98
      * Blue Yeti USB Mic for Recording & Streaming on PC and Mac, 3 Condenser Capsules, 4 Pickup Patterns, Headphone Output and Volume Control, Mic Gain Control, Adjustable Stand, Plug & Play – Silver, 2 units at $129.99, totaling $259.98.

These are necessary materials to help us accomplish our scope of work related to deliverables since we need to record the workshop videos for accessibility, and therefore they should be clear voices with no noise disturbances. These types of recordings can be done only with special professional recording camera and microphone attached to the laptop.

We also need to have hard drive of a significant storage to be able to store all our materials while we develop them (including all their versions).

We will purchase these items at the end of the Spring 2021 such that they can be used during Summer 2021 to produce the workshop materials for accessibility.

**C. TOTAL REQUEST: $ 9,594**

**5. REFERENCES**

1. Roger S Pressman, Bruce Maxim. “Software Engineering: A Practitioner's Approach” 8th Edition, ISBN: 978-0078022128, McGraw-Hill Education, 2014.
2. Steve McConnell “Code Complete: A Practical Handbook of Software Construction” 2nd Edition, ISBN: 978-0735619678, Microsoft Press, 2004.
3. Robert C Martin. “Clean Code: A Handbook of Agile Software Craftsmanship” 1st Edition, ISBN: 978-0132350884, Prentice Hall, 2008.
4. Atlassian JIRA, <https://www.atlassian.com/software/jira>. Retrieved on 1/13/2019.
5. Collab.Net, VersionOne. “The 14th Annual State of the Agile Report”. 2019.
6. Github, [http://www.github.com](http://www.github.com/) . Retrieved 9/25/2020.
7. Simon Holmes “Getting MEAN with Mongo, Express, Angular, and Node” 1st Edition, Manning Publications, 2015.
8. Jessica Williams “Software Development Trends in 2018 that Will Dominate 2019”. Retrieved from <https://medium.com/@Jessicawlm/software-development-trends-in-2018-that-will-dominate-2019-db1a1681c84d> on April 1st, 2019.
9. US Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook, Software Developers. Retrieved from <https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm> on September 21st, 2020.
10. Robert C. Martin “Clean Code: A Handbook of Agile Software Craftsmanship” 1st Edition, Prentice Hall, 2008.
11. Simon Holmes “Getting MEAN with Mongo, Express, Angular, and Node” 2nd Edition, Manning Publications, April 2019.
12. React, <https://reactjs.org/> Retrieved 9/26/2020.
13. Vue, <https://vuejs.org/> Retrieved 9/26/2020.
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Name and title of the department chair (or other administrator) who provided the Letter of Support.

Sonal S. Dekhane

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Dr. Cathy Hakes

Executive Director

Office of Research, Sponsored Programs, and Accreditation