Affordable Materials Grants, Round 19:

Continuous Improvement Grants

(Spring 2021 -Spring 2022)

Proposal Form and Narrative

# Applicant and Team Information

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| --- | --- |
| Requested information | Answer |
| Institution | Georgia Gwinnett College |
| Applicant name | Joshua Roberts |
| Applicant email  | jroberts7@ggc.edu |
| Applicant position/title | Assistant Professor of Mathematics |
| Submitter name  | Cathy Hakes |
| Submitter email  | chakes@ggc.edu |
| Submitter position/title | Executive Director, Office of Research and Sponsored Programs |

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.

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| --- | --- | --- |
| Team member | Name | Email address |
| Team member 1 | Joshua Roberts | jroberts7@ggc.edu |
| Team member 2 | Katherine Pinzon | kpinzon@ggc.edu |
| Team member 3 | Sebastien Siva | ssiva@ggc.edu |
| 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 Title: Continuous Improvement of MATH 2300 – Discrete Mathematics**

# 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
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| Requested Amount of Funding*$10,000 maximum total award per grant* | * $6,000
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| Course Titles and Course Numbers | * MATH 2300 – Discrete Mathematics
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| Final Semester of Project | * Spring 2022
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| 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.* | Resource to be revised: *Discrete Math* online textbook– <https://ggc-discrete-math.github.io/> Ancillary resources to be created:* Ancillary lecture and exemplar videos will be created
* Ancillary guided notes will be created
* Ancillary exemplar applets for most sections will be created or linked
* Homework sets will be created that directly relate to textbook order, format, and wording.
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**https://alg.manifoldapp.org/projects/discrete-math**

**1. PROJECT GOALS**

The goals of the proposed Continuous Improvement Grant project are**:**

1. To expand the work done under the previous grant the team will create guided notes for each section of the book, create and curate lecture and example videos, and create and curate applets that dynamically demonstrate the concepts in the book. The team will also create a set of online homework assignments directly tied to the free online textbook. The creation of these ancillary materials will enhance the value of the online textbook, aid in student learning, and make adoption by other faculty easier.

The example videos that are created and curated will be embedded into the online textbook so that students will be able to view the examples as they read the text. The lecture videos will be collected into a single YouTube playlist and the list will be linked in the text. In addition, the example videos will be embedded or linked in the guided notes. The purpose of the applets is to enhance student interest and engagement. They will likewise be linked or embedded into the text and notes and a full list will be made publicly available. The homework assignments will be, for the most part, algorithmic and will allow the students to have instant feedback when they do problems. The team members have experience with multiple assessment systems such as WebWork via Edfinity, Gradescope, and CodingBat. We will test the various formats and systems to determine which will best serve the students in terms of learning success, integration into LMS systems, and ease of use.

2. To enhance the work on the previous grant by editing and revising the textbook to correct errata, improve readability, and insure accessibility.

**Deliverables: The materials that will be created/revised are:**

* Revision of the textbook
* Guided notes for each section
* Lecture and example videos
* Applets
* Homework sets

**2. ACTION PLAN**

Discrete mathematics, MATH 2300, at GGC is a course primarily taken by Information Technology (ITEC) majors and focuses on three course objectives

1. Reasoning mathematically — being able to understand and construct mathematical arguments;
2. Demonstrate algorithmic thinking — verifying that algorithms work and analyzing the time required to perform specific algorithms; and
3. Use appropriate technology in the evaluation, analysis, and synthesis of information in problem-solving situations.

The class serves as a bridge between the introductory theoretical and mathematical aspects of computer science and applying them to an ITEC degree. It is a required class for all ITEC majors.

A team that **included the present applicants** successfully completed an Affordable Learning Georgia Textbook Transformation Grant in Round 14, Summer 2019 - Summer 2020 of MATH 2300. The product of that grant was an online, completely cost-free textbook that is hosted at <https://ggc-discrete-math.github.io/>. The feedback from students has been overall positive, both in terms of cost savings (the previously used textbook was priced at $205.55) and satisfaction with the content and presentation in the online text. The online textbook is currently being used by all sections of MATH 2300 at GGC. It is listed on the ALG Manifold website and is gaining interest by faculty at other institutions. **The proposed project will then build upon the success of our previous ALG work, the online MATH 2300 textbook.**

Broadly speaking, this continuous improvement grant consists of two parts - revising the currently used textbook and curating and creating ancillary materials. The textbook revisions involve editorial changes such as typos and rewording certain portions, as well as giving the book a unified voice throughout all chapters and sections.

As supplements to the textbook, the team will create a set of guided notes for each action that will summarize the textbook sections, give more examples, and extra practice problems.

The tasks, assigned project team member/s, and hours expected to be spent on each task are provided below.

* **Textbook revisions**
	+ Team members: Joshua Roberts, Katherine Pinzon, Sebastien Siva
	+ Dr. Siva will lead the revision of chapters 1 - 4.
	+ Dr. Pinzon will lead the revision of chapters 5 - 8.
	+ Dr. Roberts will lead the revision of chapter 9 - 12.
	+ The team will consult bimonthly to maintain a consistent voice for the text and consistent formatting and use of mathematical and logical symbols.
	+ Approximate time is 15 hours for each team member.
* **Guided Notes**
	+ Team member: Katherine Pinzon
	+ Using the textbook as a guide, Dr. Pinzon will create guided notes for each textbook section. The notes will include summaries of major ideas from the sections, additional written examples, and additional practice problems.
	+ Notes will include links to textbook sections at the top.
	+ After videos are finished, links will be embedded in the notes.
	+ Approximate time is 20 hours.
* **Videos**
	+ Team member: Joshua Roberts
	+ Using the textbook as a guide, Dr. Roberts will create lecture videos for each section. The lecture videos will be hosted on YouTube and divided up into “chapters” using YouTube’s timestamp functionality.
	+ Using the textbook examples as a guide, Dr. Roberts will curate and create short example problem videos. These will be hosted, or found, on YouTube.
	+ The created videos will include a link back to the appropriate sections of the textbook.
	+ Approximate time is 20 hours.
* **Applets**
	+ Team member: Sebastien Siva
	+ Using the textbook content and examples as guide, Dr. Siva will curate and create applets that demonstrate the major themes from the textbook sections.
	+ The applets will be linked or embedded in the online textbook, and are embeddable in the D2L LMS.
	+ Approximate time is 20 hours.
* **Homework Sets**
	+ Team members: Joshua Roberts, Katherine Pinzon, Sebastien Siva
	+ Dr. Siva will lead the creation of homework sets for chapters 1 - 4.
	+ Dr. Pinzon will lead the creation of homework sets for chapters 5 - 8.
	+ Dr. Roberts will lead the creation of homework sets for chapter 9 - 12.
	+ Homework problem language and symbols will be consistent with the textbook.
	+ Approximate time is 15 hours per team member.

**Plans for open licensing materials and for making materials available**

As stated previously, the project team will create guided notes as a supplement to the online textbook. The notes will be publicly available at both the GitHub site where the book is hosted as well as listed on the Manifold website. We also will curate and create two types of publicly accessible videos: lecture videos covering the content broadly and very short videos that are worked example problems. The videos will be embedded in the textbook and linked in the guided notes. In addition to the videos, the team will curate and create publicly available applets that demonstrate concepts from the text. The applets will be created with Geogebra, Desmos, or similar online applications. Finally, the team will create a set of homework assignments using the WebWorks. All materials created out of this grant will also be available through Galileo and the ALG repository.

With respect to licensing, along with the textbook, the notes, videos, and applets created under that grant will be freely available and licensed under CCBY. Any pre-existing ancillary materials that the team incorporates will likewise be freely available under a similar license.

**Plans for making materials accessible.**

The project team will work with Ms. Christine Robinson, GGC Technical Trainer/Writer and design specialist; to ensure that materials developed are ADA and 508 compliant; thereby making certain that we provide reasonable accessibility to people with disabilities to our web content and electronic and information technology.

The online textbook is in HTML format which is accessible by screen readers. The images will have alt-text added. The guided notes will be in Word format and will pass Word’s accessibility check. The videos will have closed captioning. The applets via Geobra and Desmos will follow accessibility guidelines at <https://wiki.geogebra.org/en/Accessibility>; they are touch enabled for large screen tablets. The homework system chosen will be checked to make sure it follow accessibility guidelines.

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

The textbook and guided notes will be stored on the github.io website. The applets will be hosted at Geogebra.org or Desmos.com. The videos will be embedded in the book, linked in the notes, and hosted on YouTube.com.

**3. TIMELINE**

Milestone 1 – Spring 2021

* Textbook revisions will be completed.
* Investigation and research about currently existing OER videos and applets is conducted.

Milestone 2 – Summer 2021

* Homework sets completed and linked to the relevant sections of the textbook.
* Creation of guided notes begins.
* Creation of ancillary videos and applets begins.

 Milestone 3 – Fall 2021

* Creation of guided notes is completed and they are publicly available online.
* Creation and curation of ancillary videos and applets is completed and publicly available online.
* Ancillary videos are embedded into the textbook.
* The revised textbook, and all ancillary materials already completed, will be piloted in select sections of MATH 2300 at Georgia Gwinnett College.
	+ Ancillary applets are incorporated.
	+ Student comments and suggestions are collected.

Milestone 4 – Spring 2022

* Final revisions to textbook and ancillary materials are done based on student feedback.
* Ancillary notes and applet links are added to Manifold.
* Compile information, write and submit a final report documenting the process of the textbook revision and creation of ancillaries. The report will also discuss the effectiveness of the new materials.

**4. BUDGET**

Type of Grant: Continuous Improvement grant,

Type of project: (1) Revision of open educational resources (OER) used in existing courses; (2) Creation of ancillaries for existing OER courses

Amount requested: $6,000

**Justification:**

**A. INDIVIDUAL AWARDS (not to exceed $2,000/team member): $6,000**

**Dr. Joshua Roberts, project lead**. *Textbook revision:* Dr. Roberts will lead the revision of chapters 9 - 12. He will consult with the team on a bimonthly to maintain a consistent voice for the text and consistent formatting and use of mathematical and logical symbols. *For video development:* Using the textbook as a guide, Dr. Roberts will create lecture videos for each section. The lecture videos will be hosted on YouTube and divided up into “chapters” using YouTube’s timestamp functionality. Using the textbook examples as a guide, Dr. Roberts will curate and create short example problem videos. These will be hosted, or found, on YouTube. The created videos will include a link back to the appropriate sections of the textbook. *Homework sets:* Dr. Roberts will lead the creation of homework sets for chapters 9 – 12 and will ensure that homework problem language and symbols will be consistent with the textbook.

* Pay: $1,711.01
* Fringe: $288.99. This will cover employer’s portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and ORP 9.24% at the time of submission

**Total: $2,000**

**Dr. Katherine Pinzon**, co-project lead. Textbook revision: Dr. Pinzon will lead the revision of chapters 5 - 8. She will consult with the team on a bimonthly to maintain a consistent voice for the text and consistent formatting and use of mathematical and logical symbols. Guided notes: Using the textbook as a guide, Dr. Pinzon will create guided notes for each textbook section. The notes will include summaries of major ideas from the sections, additional written examples, and additional practice problems. Notes will include links to textbook sections at the top. After videos are finished, links will be embedded in the notes. Homework sets: Dr. Pinzon will lead the creation of homework sets for chapters 5 – 8 and will ensure that homework problem language and symbols will be consistent with the textbook.

* Pay: $1,711.01
* Fringe: $288.99. This will cover employer’s portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and ORP 9.24% at the time of submission

**Total: $2,000**

**Dr. Sebastien Siva**, co-project lead. Textbook revision: Dr. Siva will lead the revision of chapters 1 - 4. He will consult with the team on a bimonthly to maintain a consistent voice for the text and consistent formatting and use of mathematical and logical symbols. Applet development: Using the textbook content and examples as guide, Dr. Siva will curate and create applets that demonstrate the major themes from the textbook sections. The applets will be linked or embedded in the online textbook, and are embeddable in the D2L LMS. Homework sets: Dr. Siva will lead the creation of homework sets for chapters 1 – 4 and will ensure that homework problem language and symbols will be consistent with the textbook.

* Pay: $ $1,711.01
* Fringe: $288.99. This will cover employer’s portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and ORP 9.24% at the time of submission

**Total: $2,000**

**B. TOTAL REQUEST: $ 6,000**

# 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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| Dr. Sonal Dekhane, Interim Dean of the School of Science and Technology, Georgia Gwinnett College |

# 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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| Dr. Cathy Hakes, Executive Director of the Office of Research and Sponsored Programs, Georgia Gwinnett College |