

Summer 2018

Introductory Medical Microbiology

Veronica Morin

Georgia Highlands College, vmorin@highlands.edu

Andrew Dawson

Georgia Highlands College, adawson@highlands.edu

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Grants Collection

Georgia Highlands College



UNIVERSITY SYSTEM
OF GEORGIA

Veronica Morin and Andrew Dawson

Introductory Medical Microbiology





Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- **Linked Syllabus**
 - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- **Initial Proposal**
 - The initial proposal describes the grant project's aims in detail.
- **Final Report**
 - The final report describes the outcomes of the project and any lessons learned.



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Initial Proposal

Application Details

Manage Application: ALG Textbook Transformation Grants

Award Cycle: Round 9

Internal Submission Deadline: Sunday, April 30, 2017

Application Title: 309

Application ID: #001751

Submitter First Name: Veronica

Submitter Last Name: Morin

Submitter Title: Associate Professor of Biology

Submitter Email Address: vmorin@highlands.edu

Submitter Phone Number: 706.368.7516

Submitter Campus Role: Proposal Investigator (Primary or additional)

Applicant First Name: Veronica

Applicant Last Name: Morin

Co-Applicant Name: Andrew Dawson

Applicant Email Address: vmorin@highlands.edu

Applicant Phone Number: 706.368.7516

Primary Appointment Title: Associate Professor of Biology

Institution Name(s): Georgia Highlands College

Submission Date: Monday, May 1, 2017

Proposal Title: 309

Final Semester of Instruction: Spring 2018

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

Veronica Morin, Ed.D., Associate Professor of Biology, Division of Natural Science, Georgia Highlands College, vmorin@highlands.edu

Andrew Dawson, Associate Professor of Biology, Georgia Highlands College, adawson@highlands.edu

Sponsor, (Name, Title, Department, Institution):

Course Names, Course Numbers and Semesters Offered:

Introductory Medical Microbiology, BIOL 2161K. This one semester course is designed for allied-health majors and is offered in fall, spring and summer semesters. Project will begin in Fall 2017 and conclude Spring 2018.

Average Number of Students per Course Section: 20

Number of Course Sections Affected by Implementation in Academic Year: 17

Total Number of Students Affected by Implementation in Academic Year: 340

List the original course materials for students (including title, whether optional or required, & cost for each item): Currently Required Textbook: Microbiology: A Systems Approach, 4th Edition by Kelly Cowan. \$271.25 new/ \$203.50 used at the campus bookstore.

Proposal Categories: OpenStax Textbooks

Requested Amount of Funding: 10,800

Original per Student Cost: 271.25

Post-Proposal Projected Student Cost: no cost to student

Projected Per Student Savings: 271.25

Projected Total Annual Student Savings: \$92,225.00

Creation and Hosting Platforms Used ("n/a" if none):

Desire2Learn (D2L) by Brightspace will be used to share generated resources with faculty and students. In addition, Galileo Open Learning Materials repository will be used to host and share the newly created ancillary materials with the public.

Project Goals:

To increase student success and retention, we have outlined the following project goals aimed at decreasing the financial burden on Introductory Medical Microbiology (BIOL 2161L) students

at our institution:

To adopt *Microbiology* (ISBN-13 978-1-938168-14-7), a no-cost textbook published by OpenStax at Rice University.

Redesign the course syllabus to align with the newly adopted textbook required for the course.

To generate and publish no-cost student support materials (Power Point lecture presentations) that supplements the OpenStax Microbiology textbook.

To generate and publish a no-cost laboratory manual that students can access in an open format via the course learning management system (D2L).

To publish all newly created course lecture materials on Galileo Open Learning Materials repository.

To survey enrolled students to determine the accessibility, quality and usefulness of generated resources in achieving student learning outcomes and student satisfaction.

Statement of Transformation:

More than 250 students were enrolled in Introductory Medical Microbiology (BIOL 2161) at Georgia Highlands College during the 2016-2017 academic year, across three campus sites (Floyd, Cartersville, & Douglasville). The current textbook *Microbiology: A Systems Approach*, 4th edition by Kelly Cowan has a list price of approximately \$271 for a new textbook and \$203 for a used textbook at the campus bookstore. Requiring this textbook creates a financial burden for many of the students pursuing allied health degrees, such as nursing and dental hygiene, especially for a one-term course. Due to financial hardships, many students do not purchase the textbook and therefore can not complete reading assignments and chapter review questions. The burden associated with cost of required materials creates barriers to student success in the course when they are unable to prepare for lecture and review course content by independently reviewing the content in the textbook. Implementing a no-cost textbook will provide a more affordable option for students while increasing utilization of course materials impacting retention and improving student achievement of course learning outcomes.

The redesign of Introduction to Medical Microbiology (BIOL 2161) course will positively impact students, faculty and the institution. Adopting an Open Educational Resource (OER) as the required textbook for the course will directly benefit students financially, since there will be no cost in accessing course materials and will also allow students to retain course materials as a reference, rather than selling back the textbook at the end of the term. The course redesign will also allow more continuity among course sections by providing a “master course” template made accessible in the course management learning system (D2L) that can be utilized by full-time and part-time faculty. The department and institution will also benefit by generating an in-house comprehensive laboratory manual that reflects the limitations and the additional expenses associated with acquisition for laboratory materials and space availability encountered when running several sections of microbiology labs at multiple sites. Laboratory

exercises can be designed to facilitate experiential learning while considering the restrictions in space, available resources and equipment, and minimizing the cost of required laboratory supplies. In addition, the laboratory manual will be delivered to students electronically through D2L and department web pages, reducing printing costs and increasing sustainability of resources.

Transformation Action Plan:

The Microbiology OpenStax textbook will be implemented for the Fall 2017 term at Georgia Highlands College to decrease the burden of cost for students in acquiring required course materials. The current textbook is publishing a new edition which will dramatically increase student costs and also limits the availability of used textbooks for students who have financial hardships. The Principle Investigator, Dr. Veronica Morin, will provide oversight of the various responsibilities associated with the implementation of the Microbiology OpenStax textbook. These responsibilities include the development of the proposal, generation of new course syllabus and student support materials (Power Point presentations and laboratory manual), confirming access to course materials via course management learning system (D2L) for instructors and students, conducting Student Learning Outcome assessments, and generating the final report. Mr. Andrew Dawson, a subject matter expert, will be responsible for developing new lecture presentation materials that support the content in the Microbiology OpenStax textbook. Dr. Morin & Mr. Dawson will create and modify existing laboratory exercises in order to reduce costs and address space limitations in microbiology laboratories. The team will be responsible for coordinating pedagogical strategies among instructors teaching Introductory Medical Microbiology (BIOL 2161) using the newly developed materials. All documents, with the exception of satisfaction surveys, will be accessible to students and instructors via the course management learning system (D2L).

Quantitative & Qualitative Measures: Quantitative measures will include: A direct comparison of final course grades between semesters using Cowan's Microbiology: A Systems Approach, 4th Ed. compared to final course grades using the newly implemented OpenStax Microbiology textbook. Assessment of current Student Learning Outcomes utilizing the previous proprietary textbook compared to the OpenStax Microbiology textbook. A direct comparison of final laboratory averages before and after the implementation of newly revised laboratory manual. Qualitative measures will include: A survey of overall student satisfaction will be given at the end of term assessing the quality of the textbook, frequency of use, and overall opinion of open educational resources implemented in the lecture and laboratory components of the course. The student satisfaction survey will be administered in a manner so that responses will remain anonymous and therefore does not require Institutional Review Board approval.

Timeline:

June 2017

Attend Kick-off meeting if grant is awarded.

June-August 2017

Develop PowerPoint lecture presentations to accompany OpenStax textbook.
Develop laboratory manual

August 2017

Implement OpenStax textbook and student support materials into Fall 2017 courses. All course materials will be accessible to enrolled students via course learning management system (D2L).

December 2017

Survey students and collect assessment data. Perform data analysis on W,D,F rates, achievement of student learning outcomes, and student satisfaction with quality and accessibility of course materials.
Edit and/or modify specific content areas or resolve accessibility issues.

January 2018

Implement OpenStax textbook and revised student support materials into Spring 2018 courses. All course materials will be accessible to enrolled students via course learning management system (D2L).

April 2018

Survey students and collect assessment data. Perform data analysis on W,D,F rates, achievement of student learning outcomes, and student satisfaction with quality and accessibility of course materials.

Edit and/or modify specific content areas or resolve accessibility issues.

Publish course materials on Galileo Open Learning Materials repository.

Complete and submit final report.

Budget:

Travel to Kick-off meeting for team members: **\$800.00**

Stipend/Course releases for Veronica Morin: **\$5,000.00**

Grant writer and subject matter expert for development of syllabus and laboratory manual, administrator of Student Learning Outcome assessment and student satisfaction survey assessment and course materials accessibility via course management learning system (D2L).

Stipend/Course releases for Andrew Dawson: **\$5,000.00**

Subject matter expert responsible for development of PowerPoint lecture presentations to accompany Microbiology OpenStax textbook and development of laboratory manual.

Sustainability Plan:

All generated course materials will be housed in a master course shell that will be accessible to instructors via D2L and be published on Galileo Open Learning Materials repository. The Microbiology course coordinator will be responsible for course assessments, updating content and editing documents for each term as needed.

GEORGIA HIGHLANDS



COLLEGE

FLOYD CAMPUS
3175 Cedartown Highway
Rome, GA 30161

VICE PRESIDENT
FOR ACADEMIC AFFAIRS

April 27, 2017

Dear ALG Grants Committee Members:

I am pleased to write this letter in support of Associate Professor of Biology Veronica Morin and Professor of Biology Andy Dawson, as they seek grant funding to incorporate free and open texts and other instructional materials for Introduction to Medical Microbiology BIOL 2161K. There are numerous reasons of efficiency, pedagogy, and instructional transformation which compel me to support this initiative.

First, this outstanding team of collegiate educators will engage in a thoughtful process that will broadly affect the student body at Georgia Highlands College. We expect to affect some 340 students per year through redesign of this course, a significant number of students needing to complete the health science pathway. Specifically, it would affect about 20 students per section x 17 sections per year, or about 340 in a year's time.

Second, money saved through this plan's implementation would provide opportunity for both economy and learning. Case in point, with textbook costs rising at an unheard of rate, our students could be saving \$92,225 by replacing current texts with open educational resources and through the generation of new lab manual and open learning materials that will be freely available to all students. In our bookstore, a new text for this class costs \$271 or \$203 for a used version. We know this affects our students' foundational learning, tenacity, and ability to thrive in this class.

Finally, this affordable learning grant will serve as a catalyst for enhanced teaching and learning. It will serve as a springboard for innovation on the part of faculty who work to make those materials more creative, applied, and relevant in today's biology classroom. It will send the message that GHC faculty members care about their students, economically, socially and intellectually. It will urge students to persist and to complete in a discipline that too often is a stumbling block to college completion.

I wholeheartedly endorse this ALG Transformation Grant application from these forward-thinking, action-oriented professors. Their plan is noteworthy and laudable. Please allow them to continue their essential work through the approval of the grant.

Sincerely,

Renna Watterson, Ed.D.

highlands.edu

Affirmative Action / Equal Employment and Educational Opportunity Institution

CARTERSVILLE CAMPUS
678-872-8000

DOUGLASVILLE SITE
678-872-4200

FLOYD CAMPUS
706-802-5000

MARIETTA SITE
678-872-8501

PAULDING SITE
678-946-1100

Round Nine

For Implementations beginning Summer Semester 2017

Running Through Spring Semester 2018

Proposal Form and Narrative

- *The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.*
- **Note: The only way to submit the proposal is through the online form in Georgia Tech’s InfoReady Review at:**

<https://gatech.infoready4.com/#competitionDetail/1757803> _
- *If you are copying and pasting into InfoReady Review from this form, first convert the file to **plain text** and copy/paste from the plain text file.*
 - o *In Word, go to File > Save As... > and change the file format to “Plain Text (.txt).”*
 - o *Copy and paste from the .txt file.*
 - o *Be sure to save both copies in case you are asked to resubmit.*
- *Microsoft Word Document formatting pasted into InfoReady Review will render the reviewer copy unreadable. **If you paste Word-formatted tables into InfoReady Review, you may be asked to resubmit your application if time permits.***
- *Italicized text is provided for your assistance; please do not keep the italicized text in your submitted proposal. Proposals that do not follow the instructions may be returned.*

Submitter Name	Veronica Morin, Ed.D
Submitter Title	Associate Professor of Biology
Submitter Email	Vmorin@highlands.edu
Submitter Phone Number	706.368.7516

Submitter Campus Role	Proposal Investigator (Primary)
Applicant Name	Veronica Morin, Ed.D & Andrew Dawson
Applicant Email	Vmorin@highlands.edu adawson@highlands.edu
Applicant Phone Number	706.368.7516
Primary Appointment Title	Veronica Morin, Ed.D., Associate Professor of Biology Andrew Dawson, Professor of Biology
Institution Name(s)	Georgia Highlands College
Team Members	Veronica Morin Andrew Dawson
Sponsor, Title, Department, Institution	Dr. Renva Watterson, Ed.D. Vice President for Academic Affairs
Proposal Title	ALG Microbiology @ GHC
Course Names, Course Numbers and Semesters Offered	Introductory Medical Microbiology (BIOL 2161K). This one semester course is designed for allied health majors and is offered in fall, spring, and summer semesters on at least 2 campus locations.
Final Semester of Instruction	Spring 2018

Average Number of Students Per Course Section	20	Number of Course Sections Affected by Implementation in Academic Year	17	Total Number of Students Affected by Implementation in Academic Year	340
Award Category (pick one)	<input type="checkbox"/> No-or-Low-Cost-to-Students Learning Materials <input type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Interactive Course-Authoring Tools and Software <input type="checkbox"/> Specific Top 100 Undergraduate Courses				
List the original course materials for students (including title, whether optional or required, & cost for each item)	Required: <i>Microbiology: A Systems Approach</i> by Kelly Cowan, 4 th Edition. Cost at campus bookstore \$271.25 new/\$203.50 used.				
Requested Amount of Funding	\$10,800.00				
Original Per Student Cost	\$271.25				
Post-Proposal Projected Per Student Cost	No cost to student				
Projected Per Student Savings	\$271.25				
Projected Total Annual Student Savings	\$92,225.00				

**Creation and
Hosting
Platforms
Used**

Desire2Learn (D2L) by Brightspace will be used to share generated resources with faculty and students. In addition, Galileo Open Learning Materials repository will be used to host and share the newly created ancillary materials with the public.

1.1 PROJECT GOALS

To increase student success and retention, we have outlined the following project goals aimed at decreasing the financial burden on BIOL 2161K students at our institution:

1. To adopt *Microbiology* (ISBN-13 978-1-938168-14-7), a no-cost textbook published by OpenStax at Rice University.
2. Redesign the course syllabus to align with the newly adopted textbook required for the course.
3. To generate and publish no-cost student support materials (Power Point lecture presentations) that supplements the OpenStax Microbiology textbook.
4. To generate and publish a no-cost laboratory manual that students can access in an open format via the course learning management system (D2L).
5. To publish all newly created course lecture materials on Galileo Open Learning Materials repository.
6. To survey enrolled students to determine the accessibility, quality and usefulness of generated resources in achieving student learning outcomes and student satisfaction.

1.2 STATEMENT OF TRANSFORMATION

More than 250 students were enrolled in Introductory Medical Microbiology (BIOL 2161L) at Georgia Highlands College during the 2016-2017 academic year, across three campus sites (Floyd, Cartersville, & Douglasville). The current textbook *Microbiology: A Systems Approach*, 5th edition by Kelly Cowan has a list price of approximately \$271.25 for a new copy and \$203.50 for a used copy at the campus bookstore. Requiring this textbook creates a financial burden for many of the students pursuing allied health degrees, such as nursing and dental hygiene, especially for a one-term course. Due to financial hardships, many students do not purchase the textbook and therefore cannot complete reading assignments and chapter review questions/activities. The burden associated with cost of required materials creates barriers to student success in the course when they are unable to prepare for lecture and review course content by reviewing chapters in the textbook. Implementing a no-cost textbook will provide a more affordable option for students while increasing utilization of course materials impacting retention and improving student achievement of course learning outcomes.

The redesign of Introduction to Medical Microbiology (BIOL 2161) course will positively impact students, faculty and the institution. Adopting an Open Educational Resource (OER) as the required textbook for the course will directly benefit students financially, since there will be no cost in accessing course materials and will also allow students to retain course materials as a reference, rather than selling back the textbook at the end of the term. The course redesign will also allow more continuity among course sections by providing a “master course” template made accessible in the course management learning system (D2L) that can be utilized by full-time and part-time faculty. The department and institution will also benefit by generating an in-house comprehensive laboratory manual that reflects the limitations and the additional expenses associated with acquisition for laboratory materials and space availability encountered when running several sections of microbiology labs at multiple sites. Laboratory exercises can be designed to facilitate experiential learning while considering the restrictions in space, available resources and equipment, and minimizing the cost of required laboratory supplies. In addition, the laboratory manual will be delivered to students electronically through D2L and department web pages, reducing printing costs and increasing sustainability of resources.

1.3 TRANSFORMATION ACTION PLAN

The Microbiology OpenStax textbook will be implemented for the Fall 2017 term at Georgia Highlands College to decrease the burden of cost for students in acquiring required course materials. The Principle Investigator, Dr. Veronica Morin, will provide oversight of the various responsibilities associated with the implementation of the Microbiology OpenStax textbook. These responsibilities include the development of the proposal, generation of new course syllabus and student support materials (Power Point presentations and laboratory manual), confirming access to course materials via course management learning system (D2L), Student Learning Outcome assessments, and generation of the final report. Mr. Andrew Dawson, a subject matter expert and instructional designer, will be responsible for developing new lecture presentation materials that support the content in the Microbiology OpenStax textbook. Dr. Morin & Mr. Dawson will update and modify laboratory exercises in order to reduce costs and address space limitations in microbiology laboratories. The team will be responsible for coordinating pedagogical strategies among instructors teaching Introduction to Medical Microbiology (BIOL 2161) using the newly developed materials. All documents, with the exception of satisfaction surveys, will be accessible to students and instructors via the course management learning system (D2L).

1.4 QUANTITATIVE AND QUALITATIVE MEASURES

Quantitative measures will include:

- A direct comparison of final course grades between semesters using Cowan's *Microbiology: A Systems Approach, 4th Ed.* compared to final course grades using the newly implemented OpenStax Microbiology textbook.
- Assessment of current Student Learning Outcomes utilizing the previous proprietary textbook compared to the OpenStax Microbiology textbook.
- A direct comparison of final laboratory averages before and after the implementation of newly revised laboratory manual.

Qualitative measures will include:

- A survey of overall student satisfaction will be given at the end of term assessing the quality of the textbook, frequency of use, and overall opinion of open educational resources implemented in the lecture and laboratory components of the course. The student satisfaction survey will be administered using SurveyMonkey.com so that responses will remain anonymous while providing analytics for each question.

1.5 TIMELINE

June-August 2017

Develop PowerPoint lecture presentations to accompany OpenStax textbook.

Develop laboratory manual.

August 2017

Implement OpenStax textbook and student support materials into Fall 2017 courses. All course materials will be available to enrolled students via D2L.

December 2017

Survey students and collect data on materials. Use data to modify and/or improve specific content areas or accessibility.

January 2018

Implement OpenStax textbook and revised student support materials into Spring 2018 courses. All course materials will be available to enrolled students via D2L.

April 2018

Survey students and collect data on materials. Make final revisions to support materials.

Publish all generated lecture and laboratory materials on Galileo Open Learning Materials Repository.

1.6 BUDGET

\$800 Travel

Travel funds to attend Kick-off meeting for team members (Veronica Morin & Andrew Dawson).

\$5,000 Veronica Morin

Grant writer, Instructional Designer and subject matter expert for development of syllabus and laboratory manual, administrator of Student Learning Outcome assessment and student satisfaction survey assessment and course materials accessibility via course management learning system (D2L).

\$5,000 Andrew Dawson

Instructional Designer and subject matter expert responsible for development of PowerPoint lecture presentations to accompany Microbiology OpenStax textbook and development of laboratory manual.

1.7 SUSTAINABILITY PLAN

All generated course materials will be housed in a master course shell that will be accessible to instructors via D2L and be published on Galileo Open Learning Materials repository. The Microbiology course coordinator will be responsible for course assessments, updating content and editing documents for each term as needed.

1.8 REFERENCES & ATTACHMENTS

Affordable Learning Georgia <http://www.affordablelearninggeorgia.org/>

Microbiology, OpenStax College (ISBN-10 1-938168-14-3)

GEORGIA HIGHLANDS



COLLEGE

FLOYD CAMPUS
3175 Cedartown Highway
Rome, GA 30161

VICE PRESIDENT
FOR ACADEMIC AFFAIRS

April 27, 2017

Dear ALG Grants Committee Members:

I am pleased to write this letter in support of Associate Professor of Biology Veronica Morin and Professor of Biology Andy Dawson, as they seek grant funding to incorporate free and open texts and other instructional materials for Introduction to Medical Microbiology BIOL 2161K. There are numerous reasons of efficiency, pedagogy, and instructional transformation which compel me to support this initiative.

First, this outstanding team of collegiate educators will engage in a thoughtful process that will broadly affect the student body at Georgia Highlands College. We expect to affect some 340 students per year through redesign of this course, a significant number of students needing to complete the health science pathway. Specifically, it would affect about 20 students per section x 17 sections per year, or about 340 in a year's time.

Second, money saved through this plan's implementation would provide opportunity for both economy and learning. Case in point, with textbook costs rising at an unheard of rate, our students could be saving \$92,225 by replacing current texts with open educational resources and through the generation of new lab manual and open learning materials that will be freely available to all students. In our bookstore, a new text for this class costs \$271 or \$203 for a used version. We know this affects our students' foundational learning, tenacity, and ability to thrive in this class.

Finally, this affordable learning grant will serve as a catalyst for enhanced teaching and learning. It will serve as a springboard for innovation on the part of faculty who work to make those materials more creative, applied, and relevant in today's biology classroom. It will send the message that GHC faculty members care about their students, economically, socially and intellectually. It will urge students to persist and to complete in a discipline that too often is a stumbling block to college completion.

I wholeheartedly endorse this ALG Transformation Grant application from these forward-thinking, action-oriented professors. Their plan is noteworthy and laudable. Please allow them to continue their essential work through the approval of the grant.

Sincerely,



Syllabus

GEORGIA HIGHLANDS COLLEGE
INTRODUCTION TO MEDICAL MICROBIOLOGY
BIOLOGY 2161K



COURSE INFORMATION:

SEMESTER/YEAR:	
CRN:	
LECTURE DAY/TIME:	
LAB DAY/TIME:	
CREDIT HOURS:	4

INSTRUCTOR INFORMATION:

NAME:	
TITLE:	
OFFICE PHONE:	
EMAIL:	
OFFICE LOCATION:	
OFFICE HOURS:	

COURSE DESCRIPTION:

Biology 2161K: Introduction to Medical Microbiology

(3-3-4) Prerequisite: BIOL 1010K, 2107K, or 2121K with a grade of C or better;

Following an overview of the classification of microorganisms, their growth requirements, metabolism, and ecological roles, emphasis is given to the host-parasite relationship, potential for pathogenicity of microorganisms, defense mechanisms of the human host including extensive discussion of immunology, and the etiological and epidemiology of infectious diseases for each human body system. Laboratory work introduces the student to identification and culture techniques, transmission control mechanisms, and common clinical isolation procedures. **Laboratory Fee Required.** [*Georgia Highlands Catalog 2016-2017*]

STUDENT LEARNING OUTCOMES FOR SCIENCE:

Georgia Highlands College Educational Effectiveness Goal for Science: Students will demonstrate knowledge of the fundamental concepts of at least one scientific discipline, and an understanding of the interplay between theory, experimentation, and observation undergirding those concepts.

Georgia Highlands College Student Learning Outcomes for Science: Students will demonstrate knowledge of the fundamental concepts of at least one scientific discipline, and an understanding of the interplay between theory and experimentation and observations undergirding those concepts.

1.	Students will demonstrate competency of one discipline in the sciences in terms of its informational content.
2.	Students will demonstrate competency of one discipline in the sciences in terms of its terminology.
3.	Students will demonstrate competency of one discipline in the sciences in terms of its commonly used units of measurement.

4.	Students will demonstrate the ability to operate basic instrumentation, gather data, analyze data, and generate conclusions in a laboratory or observational setting.
5.	Students will demonstrate the ability to apply discipline content to problem solving.

COURSE OBJECTIVES AND COMPETENCIES FOR BIOL 2161K:

Upon completion of this course, students should be able to:

1.	Identify, describe, and explain the various types of microorganisms, their general characteristics, distribution, and influence on Earth's ecosystems.
2.	Demonstrate knowledge of the history, scope and trends in microbiology.
3.	Demonstrate knowledge of naming, classifying and identifying various types of microorganisms.
4.	Identify, describe and explain the various types of microscopes and their applications.
5.	Demonstrate knowledge and application of aseptic procedures and materials for culturing and growth of microorganisms.
6.	Demonstrate knowledge of microbial metabolism and microbial genetics.
7.	Identify, describe and explain the various types of host-microbe interactions.
8.	Identify, describe and explain the general categories of therapeutic modalities available to treat infections and their mechanisms of action on microbes.
9.	Demonstrate knowledge of biotechnology related to microorganisms
10.	Identify, describe and explain disease process, signs, symptoms, etiology, course, prevention/control, diagnosis, and treatment.
11.	Identify, describe, and explain the various types of infectious diseases by human organ systems.

REQUIRED TEXT:

Lecture: OpenStax College. Microbiology; ISBN-13: 978-1938168147; ISBN-10: 1938168143
Download for FREE at: <https://cnx.org/contents/5CvTdmJL@4.9:rFziotaH@4/Introduction>

Additional course materials will be made available through GHC's course management system known as Desire2Learn or D2L. Students should log in frequently to access these course materials.

ATTENDANCE POLICY:

Lecture: In any science course, there is a direct correlation between class participation and academic performance. Attendance will be recorded for advisory purposes and administrative record keeping. It is the student's sole responsibility to obtain all materials or announcements that were missed as a result of an absence. Please note that the instructor reserves the right to administer a participation grade during any or all classes. Failure to participate will result in the loss of all points associated with an in-class participation grade.

Lab: Weekly participation in the laboratory is required. Failure to participate in laboratory will result in the loss of all points associated with that particular lab. Due to the nature of the typical lab setting, there will be no make-up opportunities to earn lab points lost due to failure to participate!!

EXTENDED ABSENCE POLICY:

Students, who have circumstances that prevent them from continuing to attend classes over an extended period of time, sometimes request that the faculty member permit them to submit work in absentia to receive credit to complete the course. If the concurrent absences will constitute more than 15% of the class sessions for the term, then written permission from the Division Chair is required before any course assignments can be completed while missing class. The student must be in good academic standing in the course to make the request. All approved coursework must be completed by the end of the semester in which the course was begun. (Note: If a program has a more stringent absence policy than this, then the program policy prevails.)

INCLEMENT WEATHER POLICY:

In the event of weather related cancellation of classes, the schedule will pick up the sequence of lectures herein described as classes resume. The semester may then be extended, or double lectures designed as we go. If we have covered all material for a test, the test will be given on the first day back to class. If there is inclement weather, the college posts necessary announcements on www.highlands.edu. Cancellation notices for Floyd or Cartersville locations will be reported to radio stations and WXIA-TV in Atlanta. However, please be advised that station regulations may not allow for clarity in location-specific announcements such as "Georgia Highlands, Cartersville only." Generally speaking, stations simply broadcast something like "Georgia Highlands is closed." Classes in Paulding, Douglasville, or Marietta will be cancelled when, respectively, North Metro Technical College, University of West Georgia, or Kennesaw State University close. Policies for distance-learning courses relative to inclement weather are different. It is assumed that all distance-learning courses are considered accessible even during periods of inclement weather.

EVALUATION METHODS and GRADING:

GRADE ITEM	POINTS POSSIBLE	POINTS EARNED	% OF COURSE GRADE
Four announced lecture tests valued at 100 points each	400		50%
All Laboratory work is valued at 200 points total (Lab average x2)	200		25%
Comprehensive final exam valued at 200 points	200		25%
Total	800		100%

DESCRIPTION OF COURSE GRADES:

Lecture Tests: There will be four announced lecture tests during the semester, which will comprise 50% of the final course grade. Each test will be valued at 100 points. A typical test contains 100 questions but may be in any format including but not limited to: multiple-choice, true/false, matching, discussion, short answer, etc. Test dates will be announced at least one week prior to the test and every effort will be made to schedule those dates at the beginning of the semester so that students can plan their schedules accordingly. All students should avoid personal conflicts on anticipated tests dates. The instructor reserves the right to change tests dates as needed and will give notice of any changes in the test schedule as soon as it's possible. Track your lecture test grades by recording your scores below:

Four Announced Lecture Tests	Points Possible	Points Earned
Test 1	100 points	
Test 2	100 points	
Test 3	100 points	
Test 4	100 points	
Total	400 points	

Lab Grade Calculation: The laboratory grade constitutes 25% of the overall course grade. The lab grade will be derived as the average of three grades: two lab practicals and a grade based on lab participation. This average will be doubled when factored into your final course grade. Each lab practical is worth 100 points and will be administered during your normally scheduled lab time. The participation grade is worth a total of 100 points and can be earned by the completion of the scheduled lab exercises. The number, format, and individual value of each lab exercise will be determined by each lab instructor. Failure to attend lab will result in loss of all points (5-10 per lab exercise) for that exercise. There are absolutely no make-up opportunities for these exercises.

Final Exam: A comprehensive final exam will be administered over content covered throughout the entire semester. The questions will be similar to previously asked test questions but the instructor reserves the right to ask all new questions over the content covered in this course. It is in the student's best interest to review each test prior to the final exam so they can avoid making the same mistakes twice and to identify areas of weakness. The comprehensive final exam constitutes 25% of the overall course grade, and is valued at 200 points.

GRADE SCALE:

90 - 100% = A 80 - 89% = B 70 - 79% = C 60 - 69% = D < 59% = F

If a student's average is 50% or higher and they have had less than three absences during the course of the semester, I will round the grade to the next whole number.

THERE WILL BE NO OPPORTUNITIES FOR EXTRA CREDIT IN THIS COURSE!

EARLY GRADES:

Georgia Highlands College offers a variety of part-of-term classes to allow our students to have flexible schedules. However, there are only three Semesters each year; Spring, Summer and Fall. It is only at the end of each Semester that grades are rolled to academic history and available on the official transcript. After each part-of-term, as soon as Instructors have entered grades, they may be viewed online by logging into the SCORE (https://discovery.highlands.edu:9986/pls/SCORE/twbkwbis.P_WWWLogin). Transcripts may also be request at any time by logging into the SCORE. Prior to the end of term, should a student need an early grade letter sent to another institution they may complete the request form and submit it to the Registrar's Office for processing (<http://www.highlands.edu/site/registrar-forms>). Please contact the Registrar's Office at registrar@highlands.edu for assistance.

EARLY WARNING PROGRAM:

Georgia Highlands College requires that all faculty members report their students' progress throughout the course of the semester as part of the institution-wide Early Warning Program (EWP). The objective of the program is to support academic success by reviewing early indicators of satisfactory student progress. In accordance with EWP, faculty members will provide the Registrar's Office with academic reports of each student enrolled in their course(s) at check points staggered throughout the semester. The following success factors are reported at their corresponding checkpoint:

Week 2: Notification of Non-Attendance

Week 6: Satisfactory or Unsatisfactory Progress

UNDER GEORGIA LAW, GRADES CANNOT BE DISTRIBUTED BY TELEPHONE OR EMAIL, OR POSTED BY SOCIAL SECURITY NUMBER.

FINANCIAL AID:

This message applies only to students receiving financial aid = "Federal regulations state that if a student did not attend classes and received failing grades, then the grades were not earned and financial aid needs to be reduced accordingly. Please be advised that any student receiving a 0.00 GPA will be required to prove that the 0.00 GPA was earned by attending classes or completing requirements for each class. Students who have earned at least one passing grade for the semester will not be affected by this regulation. If a student has properly withdrawn from all classes, the student's financial aid should be adjusted from the time they signed the withdrawal form".

TOBACCO-FREE CAMPUS:

Georgia Highlands College prohibits the use of tobacco products on any property owned, leased, or controlled by GHC. All faculty, staff, students, visitors, vendors, contractors, and all others are prohibited from using any tobacco products (i.e. cigarettes, eCigarettes, cigars, smokeless tobacco, snuff, chewing tobacco, etc.) while on GHC property.

IMPORTANT CLASS DATES: Fall 2017

Drop/Add Period:	August 19-23
Non-Attendance Reporting:	TBD
Progress Reporting:	TBD
Last day to withdraw with a "W":	October 23
Last day of Class:	December 11
Course Final Exam:	TBD
Grades Due:	Noon, December 20

EXAM POLICIES:

1.	A #2 pencil and scantron are the only item students are allowed to have at their seat during a test and/or exam. All other possessions (coats, purses, textbooks, bookbags, cell phones, food/drinks, etc.) are to be left in the front or side of the room prior to the start of the test.
2.	Exams are typically matching or multiple-choice. Students must provide their own scantron form (Form No. 882-E), which are available at the campus bookstore at a small cost. For this reason and because Scantron forms can become damaged in use, students are encouraged to be prepared with several forms at every test or exam. Scantron forms must be clean and uncreased and must be marked clearly to be read properly. Running out of forms, using forms that are in poor condition or marking forms improperly will lead to a student receiving no credit for the corresponding test or exam. The answers marked on the Scantron form are the ones graded. No credit will be given for answers marked correctly on the examination copy which are marked incorrectly on the Scantron form.
3.	Be sure all cell phones are turned OFF prior to starting a test. If a student's phone rings during a test, the student will be required to turn in their test, leave the room, and not return until the next class meeting. The student will not be allowed to complete the test and the test will be graded "as is".
4.	If a student is late for an exam (15 minutes or more), his/her exam must be handed in with the rest of the class. If any exam has been handed in prior to the student's arrival, the student may not be allowed to take the exam and may receive a zero for that assignment.
5.	Exams are graded by hand or by machine. Students must make an appointment with the instructor to review any or all old test. Students are encouraged to review tests and lab practicals to ensure accuracy of grading.
6.	No tentative averages will be calculated by the instructor. The instructor provides detailed instructions on how to calculate the course grade in the syllabus (see above). Students are encouraged to use this information to make their own calculations. The instructor will provide an S (satisfactory) or U (unsatisfactory) at mid-term to help you determine if you are making adequate progress in the course to reasonably pass the class.
7.	If a lecture test is missed for a documented emergency (i.e. hospitalization or death of an immediate family member, jury duty, military deployment, illness verified by a medical note, etc.), a make-up test over the material missed may be administered at the discretion of the instructor and at a time and location that is convenient to the instructor. Students must present documentation of the emergency upon returning to school. Proper documentation includes: doctor's statement, hospital record, court appearance letter, police report of a traffic accident, funeral program, letter from employer, tow truck bill, etc. A letter from a student's

	mother does not constitute proper documentation.
8.	Students must contact the professor within 24 hours of the absence to schedule a make-up test. Failure to contact the instructor within 24 hours of the absence will result in a loss of all rights to take a make-up test. All make-up tests must be taken within two days of the absence. If the student chooses to leave an email message for the instructor, the student must leave a phone number or email address where they can be contacted. Failure to check email or voicemail does not constitute an excuse for missing a make-up date and will not extend the amount of time to take the makeup. The instructor will schedule all make-ups within two days of missing a test.
9.	Only one make-up test is allowed for the entire course! There will be no "re-takes". Make-up tests can be in any format and may include any or all of the following: essay, multiple-choice, fill in the blank, matching.

GENERAL COURSE ETTIQUETE & POLICIES:

1.	EMAIL: GHC email is the official means of communication used by the college. If a student experiences technical difficulties with their Georgia Highlands College email, they should contact the IT Office immediately. The Cartersville IT Office is located in Room 171a. The instructor is not responsible for technical difficulties that arise with email (especially if the student is using an email account other than the provided Georgia Highlands College email account). Students may opt to have their GHC email forwarded to their personal email account however, the instructor will not respond to emails coming from personal email accounts.
2.	DISRUPTIVE BEHAVIOR: Board of Regents policy: "Any student, faculty member, administrator, or employee, acting individually or in concert with others, who clearly obstructs or disrupts, or attempts to obstruct or disrupt any teaching, research, administrative, disciplinary, or public service activity, or any other activity authorized to be discharged or held on any campus of the University System is considered by the Board to have committed an act of gross irresponsibility and shall be subject to disciplinary procedures, possibly resulting in dismissal or termination of employment" (BR Minutes, 1968-69, pp. 166-168; 1970-71, p. 98) source: USG Manual
3.	TECHNOLOGY: The instructor is not responsible for technical difficulties that arise with D2L. A "Getting Started Tutorial with D2L" is available at: http://www.highlands.edu/d2l . Students can get 24 Hour online Assistance at: https://d2lhelp.view.usg.edu . Students can retrieve their D2L login credentials from the GHC ID Lookup link at: http://www.highlands.edu/site/banner-portal .
4.	LAB STATEMENT: Since this course involves a laboratory component, there are specific safety issues that students need to be aware of (such as use of lab coats and/or safety goggles, or any other example specifically related to that course). It is the student's responsibility to be aware of all such issues and act in an extremely cautious manner to avoid any potential causes for accidents in the laboratory. GHC is not liable for any accidents in the lab due to negligence on the part of any individual. Specific safety issues are discussed in the lab manual and laboratory safety lecture. It is also recommended that if you are pregnant or intend on becoming pregnant during the course, that you not take the course at this time.

WITHDRAWAL POLICY:

In order to withdrawal, a course withdrawal form or a complete withdrawal form must be obtained from the Admissions and Records Office, filled out by the student, signed and submitted to the registrar's office. If this paperwork is not done, then you are still considered enrolled in the course and will get an F even if you don't participate at all. Do not expect a grade change from F to W once it is on the permanent transcript (following the close of the semester).

Any withdrawals after mid-semester will result in WF unless the Academic Vice-President's office gives approval for a hardship non-punitive withdrawal. Such a decision is made cooperatively between the Academic Vice-President's Office and the instructor. Having a less-than-desirable grade average is not reason enough for a hardship case. Make a decision based on grade before mid-semester. In such a case, inform the instructor of the hardship situation, and then

inform the Office of the Vice President of Academic Affairs (Rome Campus). With appropriate documentation, the VP will send a letter of permission to the instructor to allow a non-punitive withdrawal.

In any withdrawal, forms are available at the Help Desk. It is also important that you check with the Financial Aid Office to see how your withdrawal might impact any financial aid.

DISABILITY STATEMENT:

"If any student in the class feels that he or she needs accommodation due to a disability, please feel free to discuss this with the instructor early in the term. Georgia Highlands College has resources available for students with certain disabilities. Accommodations may be made (such as providing materials in alternative formats, assuring physical access to classrooms or being sensitive to interaction difficulties that may be posed by communication and/or learning disabilities) through Student Support Services on all campuses. For more information please contact: Cartersville 678-872-8004; Douglasville and Floyd 706-368-7536; Marietta 678-915-5021; Paulding 678-946-1029."

ACADEMIC INTEGRITY

Cheating is strictly prohibited. Any evidence of cheating, or collaboration in cheating will result in a zero on the assigned materials and possible further disciplinary actions which may include failure in the course. Behavior that may be perceived as cheating includes but is not limited to:

- talking immediately before, after, and/or during the administration of an exam
- looking in the direction of another student's exam or towards notes, textbook, etc.
- fumbling through a book-bag, knapsack, purse, etc.
- use of scrap paper that is not blank during the administration of an exam
- use of a cell phone or other electronics during an exam
- having anything other than a pencil and the test at your desk during the exam
- using a graphing calculator or cell phone calculator during an exam

Any appearance of cheating will be regarded as cheating so students should avoid any and all behaviors that could even be construed as cheating. Policies on student conduct and academic integrity are located in the GHC "Student Guide and Planner" and in the Student Handbook at <http://www.highlands.edu/site/academic-integrity-documents>.

TENTATIVE LECTURE SCHEDULE

Fall 2017

NOTE: This is a tentative lecture schedule for BIOL 2161K. The instructor(s) teaching these classes reserves the right to alter this schedule at his/her discretion. Any changes in this schedule will be announced to the students as soon as it is possible.

DATE	CONTENT	OPENSTAX
August 21	An Invisible World	Chapter 1
August 23	How We See the Invisible World	Chapter 2
August 28	The Cell	Chapter 3
August 30	Prokaryotic Diversity	Chapter 4
September 4	No Lecture or Lab Labor Day	
September 6	Eukaryotic Diversity	Chapter 5

September 11	Acellular Pathogens	Chapter 6
September 13	Exam #1	Chapters 1-6
September 18	Microbial Metabolism	Chapter 8
September 20	Microbial Growth	Chapter 9
September 25	Biochemistry of the Genome	Chapter 10
September 27	Microbial Genetics	Chapter 11
October 2	Applications of Microbial Genetics	Chapter 12
October 4	Microbial Growth	Chapter 13
October 9	Exam #2	Chapters 7-13
October 11	Antimicrobial Drugs	Chapter 14
October 16	Microbial Mechanisms of Pathogenicity	Chapter 15
October 18	Epidemiology	Chapter 16
October 23	Last Day to Withdraw From the Course	
October 23	Diseases of the Immune System	Chapter 19
October 25	Lab Analysis of the Immune System	Chapter 20
October 30	Exam #3	Chapters 14-16, 19, 20
November 1	Skin and Eye Infections	Chapter 21
November 6	Respiratory System Infections	Chapter 22
November 8	Urogenital System Infections	Chapter 23
November 13	Digestive System Infections	Chapter 24
November 15	Digestive System Infections	Chapter 24
November 20 & 22	Lab Lab or Lecture Thanksgiving Break	

November 27	Circulatory and Lymphatic System Infections	Chapter 25
November 29	Circulatory and Lymphatic System Infections	Chapter 25
December 4	Nervous System Infections	Chapter 26
December 6	Exam #4	Chapters 21-26
December 11	Overflow-Review	
TBD	Comprehensive Final Exam	All Previously Covered Chapters

TENTATIVE LABORATORY SCHEDULE

Fall 2017

NOTE: This is a tentative laboratory schedule for BIOL 2161K. The instructor(s) teaching these classes reserves the right to alter this schedule at his/her discretion. Any changes in this schedule will be announced to the students as soon as it is possible.

Week of:	Monday/Tuesday	Wednesday/Thursday
August 21	No Labs	No Labs
August 28	Introduction/Orientation Use of the Compound Microscope Classification of Common Bacteria	Sterile Technique & Bacterial Transfers
September 4	No Labs – Labor Day	Observation of Growth Patterns Streak Plate Technique
September 11	Gram Staining	Gram Staining continued
September 18	Acid-Fast Staining	Acid-Fast Staining continued
September 25	Lab Skills Test – Day 1	Lab Skills Test – Day 2
October 2	Observation of Metabolic Activity	Observe Results
October 9	Milk Microbiology	Observe Results
October 16	Physical Agents of Microbial Control	Observe Results
October 23	Disinfectant & Antibiotic Sensitivity Chemical Control of Microbial Growth	Observe Results
October 30	Use of Selective & Differential Media	Observe Results
November 6	Normal Flora & Opportunistic Pathogens	Observe Results
November 13	Catalase & Coagulase Testing Read and Discuss Results	Lab Final Exam

GOOD LUCK! HAVE FUN! And remember, I am here to help you succeed in this course. Please do not hesitate to ask questions if you need assistance.

In order to access detailed course materials including lecture notes, powerpoints, practice quizzes, and study guides, students must log into D2L: <https://highlands.view.usg.edu/>

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Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

To submit your Final Report, go to the Final Report submission page on the ALG website:
http://affordablelearninggeorgia.org/site/final_report_submission

Final report submission requires four files:

- This completed narrative document
- Syllabus or syllabi
 - (if multiple files, compress into one .zip folder)
- Qualitative/Quantitative Measures data files
 - (if multiple files, compress into one .zip folder)
- Photo of your team or a class of your students w/ at least one team member, minimum resolution 800x600px
 - (nearly all smartphones take photos larger than this size by default)

Follow the instructions on the webpage for uploading your documents. Based on receipt of this report, ALG will process the final payment for your grant. ALG will follow up in the future with post-project grantee surveys and may also request your participation in a publication, presentation, or other event.

General Information

Date: February 28, 2018

Grant Round: 9

Grant Number: 309

Institution Name(s): Georgia Highlands College

Project Lead: Veronica Morin

Team Members:

- Veronica Morin, Associate Professor of Biology, Georgia Highlands College, vmorin@highlands.edu
- Andrew Dawson, Associate Professor of Biology, Georgia Highlands College, adawson@highlands.edu

Course Name(s) and Course Numbers: Introductory Medical Microbiology, BIOL 2161K

Semester Project Began: Fall 2017

Final Semester of Implementation: Spring 2018

Total Number of Students Affected During Project: 275

1. Narrative

In an effort to increase student success and retention in the Introductory Medical Microbiology course (BIOL 2161K) at Georgia Highlands College, we implemented six strategies focused on improving the quality of course materials while also reducing the fiscal burden that students encounter when purchasing the required course materials for the Introductory Medical Microbiology (BIOL 2161K) course at GHC. Student perception of the newly adopted OpenStax *Microbiology* textbook was overwhelmingly positive. Student performance on student learning outcomes (SLO) assessments improved with the implementation of OERs in the course compared to previous semesters. All SLOs had higher performance measures in the Fall 2017 (after adoption/implementation) terms when compared to the Spring 2017 (before adoption/implementation) term.

The revised lab manual was well received by both students and faculty. The laboratory protocols were updated to include images of the materials and expected results and post-laboratory follow-up questions designed to help students summarize the results of their activity and observations. Students had positive responses to the cost and quality of the laboratory manual. Students also strongly agreed that the revised manual was useful in helping them to understand the concepts and preparing for examinations.

We faced several challenges as we implemented the new course materials. Some faculty expressed concerns regarding the overall quality of the textbook's content and usefulness. In particular, faculty expresses a lack of satisfaction regarding the images and illustrations in the textbook resulting augmentation of the instructional material with images from other sources. As a result, some faculty members did not fully integrate the new course materials into their respective sections and chose to utilize their own notes from previous semester to deliver the course material to students. Another challenge that we encountered during the implementation process was getting faculty members to participate in the data collection and reporting.

In the future, we would like to further develop additional ancillary designed to reinforce the weak content areas in the textbook and also provide additional examples and images to help students can make stronger connections to the concepts being addressed. Furthermore, we would like to develop additional assessment tools that can be delivered via Desire2Learn (D2L) in order to easily capture data on student learning outcomes. Implementing new course materials that are lacking in instructional resources was the most challenging aspect of this course transformation. In order to provide a greater incentive for faculty to fully adopt the materials, we need to create quizzes, exams, and chapter guides that can provide additional instructional support, especially for part-time and temporary faculty.

2. Quotes

The following comments were noted on the Student Satisfaction Surveys that were administered during the Spring 2017 & Fall 2017 semesters.

- “I did not buy the book because it was too expensive” SP17
- “The power points were very helpful in lecture” SP17
- “The power points were all I used for lecture” FA17
- “I used the online version of the text” FA17
- “Study guides would be really helpful!” FA17

3. Quantitative and Qualitative Measures

3a. Uniform Measurements Questions

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Students during the Fall 2017 term had the most positive responses to the cost, quality, and the end of chapter review materials of the adopted OpenStax *Microbiology* textbook and felt the textbook helped them to understand the course material discussed in class when compared to the Spring 2017 term which used a textbook published by McGraw-Hill (Cowan, *Microbiology: A Systems Approach*).

Total number of students affected in this project: **275 students** (spring, summer fall 2017)

- Positive: **71% of 61** respondents strongly agreed with the cost of the OpenStax *Microbiology* textbook whereas **17% of 75** respondents strongly agreed with the cost of the *Microbiology: A Systems Approach* by Cowan textbook.
- Positive: **21% of 61 respondents** strongly agreed that they read the textbook chapters of the OpenStax *Microbiology* textbook whereas **12% of 75** respondents strongly agreed that they read the chapters of the *Microbiology: A Systems Approach* by Cowan textbook.
- Positive: **56% of 61 respondents** strongly agreed that they were satisfied with quality of the textbook chapters of the OpenStax *Microbiology* textbook whereas **28% of 75** respondents strongly agreed that they were satisfied with quality of the *Microbiology: A Systems Approach* by Cowan textbook.
- Neutral: **98% of 61** respondents strongly agreed that they utilized the ancillary support materials provided by the instructor when using OERs while of the **93% of 75** of respondents strongly agreed that they utilized the ancillary support materials provided by the instructor when using *Microbiology: A Systems Approach* by Cowan.

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Student performance on student learning outcomes (SLO) assessments improved with the implementation of OERs in the course compared to previous semesters. All SLOs had higher performance measures in the Fall 2017 (after adoption/implementation) terms when compared to the Spring 2017 (before adoption/implementation) term.

Choose One:

- Positive: Higher performance outcomes measured over previous semester(s)
- Neutral: Same performance outcomes over previous semester(s)
- Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

The comparative impact on DFW rates was neutral. Before implementation of OER materials, 18.1% of BIOL 2161 students dropped, failed, or withdrew (DFW) from the course. After the implementation of OER materials, 18.7% of BIOL 2161 students DFW from the course.

Drop/Fail/Withdraw Rate:

18.7% of students, out of a total of **91** students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- Negative: This is a higher percentage of students with D/F/W than previous semester(s)

3b. Measures Narrative

During the process of adopting and implementing the OpenStax Microbiology textbook, an OER, in the Introductory Medical Microbiology (BIOL 2161K) course at Georgia Highlands College, we have observed the following positive outcomes: improved performance on student learning

outcome assessments, increased student satisfaction with the cost and quality of the course materials, and usefulness of course materials in understanding content. A variety of qualitative and quantitative data sources were utilized to capture the data on student satisfaction and performance before and after implementation of OERs into the BIOL 2161 course, to include student surveys, student learning outcomes assessment tools, and final grades from the Spring 2017 term (before implementation) to Fall 2017 (after implementation).

Final Course Grades:

Final course grades were quantified to determine the effects of the course transformation on student success and retention. We compared final course grades for the Spring 2017 term (before OER adoption and implementation) and the Fall 2017 terms (after OER adoption and implementation) to determine if differences existed among the grade distributions. While the DFW rates did not change after adopting and implementing OERs. The withdrawal rate increased from 9% before implementation to 12% after implementation. However, the number of B’s earned by students increased 6% and the number of C’s earned by students decreased 6% from the Spring 2017 to the Fall 2017 term. A summary of the DFW data is presented below (Table 1) and the complete data set for final course grades can be found in Appendix A.

Table 1. DFW Data Before and After OER Implementation

	Before- Cowan	After- OpenStax
	Number of Students	
Grade	Spring 2017	Fall 2017
A	37	25
B	47	36
C	29	13
D	11	1
F	1	5
W	13	11
Total	138	91
	18.1% DFW	18.7%DFW

Student Learning Outcomes Assessments:

Quantitative methods were used to determine the effects of OER implementation on student performance on outcome based assessment methods. Assessment questions were developed to address each student-learning outcome (SLO) and were administered on the final exam. The number of students taking the final exam and the number of students missing each assessment question were reported at the end of each term. Performance measures for all SLOs increased by at least 10% after implementation of the OER materials! Student performance on SLO #3

had the most dramatic increase of 39%. This SLO states students will demonstrate competency in terms of its commonly used units of measurement. There was also a significant increase in student performance on SLO #1, which had an increase of 32%. This SLO states students will demonstrate competency in terms of its informational content. While the SLO assessment data appears to have improved as a result of the course transformation, it should be noted that there was unreported data that could have influenced the final results that were reported. Assessment data will be collected and reported each term to determine if there are any deviations in future assessments of student learning outcomes. A summary table of the changes in student performance on SLO assessment during the course transformation is presented below (Table 2). The complete data set for SLO assessment and the SLO statements can be found in Appendix A.

Table 2. SLO Performance Measures

	SLO				
	#1	#2	#3	#4	#5
% Increase of Student Performance Measures	32	11	39	11	15

Laboratory Grades:

A quantitative analysis was conducted using final laboratory averages during the course transformation. Final lab averages were calculated for each section for the Spring 2017 term (before OER implementation) and the Fall 2017 term (after OER implementation). There were no significant changes in the laboratory final averages among course sections during the course transformation. A summary of the data collected on lab final averages is presented below (Table 3). While the lab manual was updated and revised, the protocols were not changed dramatically which may be why there was not substantial change among the final grade earned in the laboratory component of the course.

Table 3. Final Lab Averages

Lab Final Avg.	Old Manual	Revised Manual
	SP17	FA17
Section 1	71	82
Section 2	84	77
Section 3	79	81
Section 4	75	72
Lab Averages	77	78

Student Satisfaction Surveys:

Student satisfaction was analyzed using a qualitative assessment tool. A survey was developed to determine student levels of satisfaction regarding various aspects of the lecture and laboratory materials before and after implementation of OERs. Students during the Fall 2017 term had the most positive responses to the cost, quality, and the end of chapter review materials of the adopted OpenStax *Microbiology* textbook and felt the textbook helped them to understand the course material discussed in class when compared to the Spring 2017 term which used a textbook published by McGraw-Hill (Cowan, *Microbiology: A Systems Approach*).

4. Sustainability Plan

All newly created materials are currently housed in a D2L master course shell so that all instructors have access to all generated materials and can easily copy the components into their course sections each term. Veronica Morin will be responsible for updating the files as needed and will also be responsible for collecting/reporting the assessment data each academic year.

5. Future Plans

In an attempt to encourage and guide students in preparedness for lecture and laboratory class meetings, we plan to develop additional ancillary materials for students that require them to utilize the textbook and lab manual prior to attending lecture and laboratory sessions. These materials may include, but are not limited to pre-laboratory quizzes, chapter quizzes, in-class discussion topics based on chapter reading assignments, chapter study guides, practice exams, and additional student learning outcome assessment tools. We also identified that there is a need to develop more instructor resources to support our part-time and temporary faculty and facilitate the delivery and data reporting for course assessments. In addition, creating separate assessments for both lecture and laboratory components could provide insight on the effectiveness of the lecture and laboratory materials and serve as a guide during future revisions and development of new materials.

6. Description of Photograph

Mr. Andrew Dawson (Professor of Biology) & Dr. Veronica Morin (Associate Professor of Biology) Photo taken on February 19, 2018 by Dr. Mark Knauss.

