

Fall 2015

Introduction to Physics

Soumitra Chattopadhyay
Georgia Highlands College, schattop@highlands.edu

Jeffrey Linek
Georgia Highlands College, jlinek@highlands.edu

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Recommended Citation

Chattopadhyay, Soumitra and Linek, Jeffrey, "Introduction to Physics" (2015). *Physics and Astronomy Grants Collections*. Book 1.
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Grants Collection

Georgia Highlands College



UNIVERSITY SYSTEM
OF GEORGIA



Soumitra Chattopadhyay, Jeff Linek

Introduction to Physics





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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Syllabus

**TENTATIVE SCHEDULE**

This is a tentative schedule. The professor will try to adhere to the schedule as far as practicable. However, the professor reserves the right to alter the organization of the course if and when deemed necessary.

Week	Lesson/Assignment/Tests/Quizzes
One	Introduction: The Nature
Two	Introduction: Kinematics – Motion in One Dimension; Problem Session (CONTD.)
Three	Newtonian Mechanics; Problem Session
Four	Newtonian Mechanics; Problem Session, <u>Hour Exam 1: 9/15/2015 (Kinematics and Newtonian Mechanics)</u>
Five	Applying Newton's Laws of Motion; Problem Session
Six	Applying Newton's Law, Circular Motion; Problem Session
Seven	Impulse and Linear Momentum; Problem Session
Eight	Impulse and Linear Momentum, and Work and Energy; Problem Session <u>Hour Exam 2: 10/6/2015 (Momentum and Energy)</u>
Nine	Objects at Rest , Problem Session
Ten	No Class on Tuesday – Fall Break; Rotational Motion ; Problem Session
Eleven	Gases ; Problem Session
Twelve	Static Fluids ; Problem Session; <u>Hour Exam 3: 11/3/2015 (Rotational Motion and Phases of Matter – Solids, Liquids and Gases)</u>
Thirteen	Fluids In Motion ; Problem Session
Fourteen	Fluids In Motion ; First Law of Thermodynamics , Problem Session
Fifteen	First Law of Thermodynamics, Second Law of Thermodynamics ; Problem Session, No class on 11/26/2015 (Thanksgiving)
Sixteen	Laws of Thermodynamics, continued ; Last day of class for all courses on 12/7/2015
Seventeen	Last day of class for this course on 12/5/2015
	Test 4 (FINAL - COMPREHENSIVE) on 12/8/2015 at 11:00 AM

Initial Proposal

**Affordable Learning Georgia Textbook Transformation Grants
Round 2
Summer 2015, Fall 2015, Spring 2016
Proposal Form and Narrative**

Please complete per inline instructions; the completed document is not to exceed four pages. The 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.

Institution Name(s)	Georgia Highlands College				
Team Members (Name, Title, Department, Institutions if different, and email address for each)	Dr. Soumitra Chattopadhyay, Professor, Division of Science and Physical Education, schattop@highlands.edu ; and Dr. Jeffrey Linek, Professor of Mathematics and Director of eLearning, jlinek@highlands.edu				
Sponsor, Title, Department, Institution	Dr. Renva Watterson, Vice President for Academic Affairs, Georgia Highlands College				
Course Names, Course Numbers and Semesters Offered (Summer 2015, Fall 2015, or Spring 2016)	Introduction to Physics, PHYS 1111, Fall and Summer of every year, Fall 2015				
Average Number of Students Per Course Section	24	Number of Course Sections Affected by Implementation in Academic Year 2016	4	Total Number of Students Affected by Implementation in Academic Year 2016	~100
Award Category (pick one)	<input type="checkbox"/> No-Cost-to-Students Learning Materials <input checked="" type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Course Pack Pilots <input type="checkbox"/> Transformations-at-Scale				

1. PROJECT GOALS

The goal of this project is to lower the student's cost for the learning materials associated with Introductory Physics. To this end, students will not have to purchase any textbooks, yet they will have full access to the material needed to succeed in the course. Use of relevant cost-free materials for the course allows all course content to be housed in D2L. In doing so, students will have complete access to all course materials without the need to purchase a book. Because materials used in the course will be free of cost, students will be more likely to remain in and successfully complete this vital course.

1.1 STATEMENT OF TRANSFORMATION

Georgia Highlands College is an open access institution. Many of the students attending this college come from a background that cannot afford a book. PHYS 1111 is a course in Area D (required Science and Math skills category) in the University System of Georgia as well as the Technical College System of Georgia. Also, this is a basic science and math skills required course at private institutions, where the course number may be different. A comparative study shows that most of the textbooks available in the market costs between \$111 and \$330. This is extremely expensive for many of the students who attend our institution. Additionally, as the course is developed and all materials are stored within a master course in D2L, anyone teaching this course at GHC, whether full-time instructors or adjunct faculty members, will have access to the teaching materials. This will ensure continuity and streamlined teaching material institution-wide. In addition, the course materials components can be exported and shared with other institutions throughout Georgia.

1.2 TRANSFORMATION ACTION PLAN

All materials will be obtained from OpenStax, and videos demonstrations etc. located on YouTube, journal articles, movies, from GALILEO, Films On Demand, MERLOT, and other open sources. The tests, quizzes, and D2L evaluation and assessment tools, developed in conjunction with this project, will be used from and stored in the learning management system, currently Brightspace by D2L (Desire2Learn). Thus, students will have access to the material needed for the course from anywhere they have access to an Internet connection. All Physics instructors will have complete access to course materials and will have a means to better assist students towards success. Student success in this course will assist the institution in achieving retention goals in compliance with Complete College Georgia. Furthermore, having all the instructors use the same course materials will create a continuity within the course which will make this fundamental science course stronger.

The development and sustainability team contains members with extensive experience in teaching Physics and Mathematics, and with the pedagogy and technical aspects on online course design. It will be the role of Dr. Chattopadhyay to guide and lead the process as a subject matter and instructional design expert as it relates to Physics. The

team will utilize Dr. Linek's experience in distance education as he will act in the capacity of the technical and online methodology expert.

To provide for open access to the materials developed, a public Web site will be constructed to house the content of the course. This site will be linked to the Georgia Highlands College Web site. However, as part of this project, research will be conducted as to the best title for the main page so as to maximize its profile with Internet search engines.

1.3 QUANTITATIVE AND QUALITATIVE MEASURES

This project will use both qualitative and quantitative instruments to measure the effectiveness of the project. Quantitatively, a survey will be given at the beginning and the end of the course to find whether the students preferred a traditional textbook or the OpenStax text and associated material used in the course. It will be given to all students taking the course to find out the likeability of the online resources usage, and student opinions as to the role the materials played in their success. The pre- and post-surveys will be identical in content and will be manually graded by the instructor, and the data will be entered and analyzed using statistical software. Qualitatively, the success rate of students taking a traditional class (one that uses the traditional textbooks) and this proposed class will be compared and conclusions about the feasibility of using this course model will be analyzed. The data collected over a period of two semesters will be compared. This data will be included in the final report of the project to demonstrate the project's success.

1.4 TIMELINE

January 1, 2015 – May 31, 2015: Selection of OpenStax, YouTube, GALILEO, MERLOT and other open resources

June 1, 2015 – July 31, 2015: D2L Master Course redesign

August 12, 2015 – December 15, 2015: Implementation of redesigned course in one section of PHYS 1111

January 2016 - March 2016: Continuous formative evaluation of redesign with student input

March 2016: Evaluation of Course Redesign (Student Survey and Interviews)

April 2016: Analysis of Evaluation and Course Revision (if needed)

August 2016: Report to the GHC faculty on outcomes of the project.

August 2016: Implementation of Redesigned Course - All Fall 2016 PHYS 1111 Sections

August 2016 – December 2016: Continuous formative evaluation of redesign with student input

January 2017: Evaluation of Course Redesign (Student Survey and Interviews)

January 2017: Analysis of Evaluation and Course Revision (if needed)

1.5 BUDGET

Dr. Soumitra Chattopadhyay: \$5,000

Dr. Jeffrey Linek: \$5,000

Travel: \$800

Total: \$10,800

1.6 SUSTAINABILITY PLAN

PHYS 1111 is offered every Summer and Fall semesters and is one of the options for students pursuing a Transfer program. A majority of the students attending Georgia Highlands College fall into this category. Thus, this course redesign will affect the majority of students at our institution. We plan to review and update materials three times a year (January, April-May, and August). This will allow us to not only ensure that the materials are still available and that links are working, but will also allow us to replace any outdated materials. This process is vitally important since MERLOT and GALILEO constantly update their offerings. In addition to reviewing the materials ourselves we will also seek student feedback. We believe that students should be actively involved in course design since it directly affects their learning experiences. This feedback

will be collected informally by both team members using a convenience sample of students enrolled in their classes.

1.7 REFERENCES & ATTACHMENTS

A body of literature supports our redesign plans. First, Open Educational Resources (or OERs) are supported across a wide variety of research studies and more reflective pieces. In a study by Bliss et al (2013), community college students and faculty perceived OERs as a positive inclusion to the curriculum. Both groups viewed OERs as equal in quality to traditional materials while also citing perceived increases in cost-savings and learning. Issack (2011) explored the sustainability of OERs and found that “OERs help maintain a good quality level, sustain a viable economic model with reduction of tuition fees for learners, increase access and achieve the intended learning outcomes without any negative impact on the learners' experience”. Not only do OERs increase cost savings and perceived learning but also increase faculty autonomy. By removing the required, proprietary textbook from the classroom faculty are free to remix and reuse resources as needed. In addition, it can be argued that the use of OERs contribute to a more democratic society. According to Koustelini (2012) “this unquestioned use of textbooks contributes to the unquestioned preservation of the social, economic, and political status quo, and it prevents teacher’s involvement in changing the monolithic educational agenda”. Conversely, a move away from textbooks subverts this model. Second, primary sources are a powerful learning tool across the curriculum and across different measures of learning. The inclusion and analysis of primary sources has been found to improve students’ general critical thinking skills (Dutt-doner et al, 2007), discipline-specific research skills (Tally & Goldenberg, 2005), and levels of compassion (Farmer et al, 2007). Third, research supports the inclusion of students in course design (Bovill, Cook-Sather, & Felten, 2011). Both McDaniel College and Elon University are currently including students in course design (Walker, 2011). At Elon students “appear to have learned at least as much as students in prior versions of the class; additionally, they reported significantly higher satisfaction with the class, in part because they appreciated that peers had helped to design the course” (Walker, 2011). At McDaniel this process has increased empathy and understanding between students and faculty members (Walker, 2011). Fourth, OERs increase faculty autonomy. By removing the required, proprietary textbook from the classroom, faculty are free to remix and reuse resources as needed. In addition, it can be argued that the use of OERs contribute to a more democratic society. According to Koustelini (2012) “this unquestioned use of textbooks contributes to the unquestioned preservation of the social, economic, and political status quo, and it prevents teacher’s involvement in changing the monolithic educational agenda”. Conversely, a move away from textbooks subverts this model.

A recent film by CNN Films (Ivory Tower – Is College Worth it?) concluded that the cost of attending college has become so much that students and parents are getting equally frustrated by the time and money spent to attend college. It is great to see that “Affordable Learning Georgia” is trying to find cheaper The efforts of Affordable

Learning Georgia and this project fit well in addressing these concerns to find solutions to make college affordable to the citizens of the state. It is an honor to submit proposal to that endeavor trying to make a difference in our students' lives.

The authors would like to acknowledge the help and support of Mrs. Sarah Hepler, Director of Faculty Academy at Georgia Highlands College and Dr. Nancy Devino, Grants Coordinator of Technical College System of Georgia.

Also attached is an Excel Sheet showing Introductory Physics textbook prices comparison from various sources.

PROPOSAL SUBMISSION: ALL PROPOSAL DOCUMENTS, REFERENCES, AND ATTACHMENTS MUST BE SUBMITTED IN A SINGLE EMAIL TO ALG@GATECH.EDU.

DEADLINE FOR CATEGORIES 1-3: 5:00 PM, NOVEMBER 30, 2014

DEADLINE FOR CATEGORY 4: 5:00 PM, DECEMBER 8, 2014

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: December 18, 2015

Grant Number: 98

Institution Name(s): Georgia Highlands College (GHC)

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

(i) Dr. Soumitra Chattopadhyay, Professor of Physics, Natural Sciences and Physical Education, schattop@highlands.edu

(ii) Dr. Jeffrey Linek, Director of eLearning and Professor of Mathematics, Division of eLearning, jlinek@highlands.edu

Project Lead: Dr. Soumitra Chattopadhyay, Professor of Physics, Natural Sciences and Physical Education

Course Name(s) and Course Numbers: Introductory Physics I, PHYS 1111

Semester Project Began: Spring 2015

Semester(s) of Implementation: Fall 2015

Average Number of Students Per Course Section: 12 (at the beginning of the semester), and 9 (at the end)

Number of Course Sections Affected by Implementation: 1

Total Number of Students Affected by Implementation: 12

1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project. Include:

- Summary of your transformation experience, including challenges and accomplishments
 - The transformation experience was mixed, but overall positive. One of the reasons for this is that GHC is a State College with significant two-year access role within its mission. Hence, there are very few students who are genuinely interested in the subject of Physics. As a result, this semester, things got a bit more complex because a low enrollment in the PHYS 2211 course forced the Division, for budgetary reasons, to combine PHYS 1111 and PHYS 2211 so that the lecture meetings were within the same room at the same time. While the basic material covered in the two courses are the same, PHYS 1111 is an algebra-based course while PHYS 2211 is a calculus-based course.
 - While the Rice OpenStax text is in a PDF and Web forms, it also permits faculty to download the HTML files of each section. However, the file naming structure was confusing and does not let one easily determine which chapter or section is with the file. In addition, in order to effectively use these file within D2L (Brightspace), the file extensions of all photos, tables and links within all pages needed to be

reformatted. Furthermore, to allow for the concept questions and exercises to be more readily accessible to students, new files in the form of Web pages were created and placed in the course. We believe that the format of a section reading page and concept questions and exercises is most beneficial for students.

- Transformative impacts on your instruction
 - One thing that can be positively said is that all the materials are now stored in D2L for anyone teaching this course at the institution to use without having to buy or subscribe to additional expensive books and journals. Moreover, this makes the materials more easily adapted to online, hybrid, or lecture formats of the course.

- Transformative impacts on your students and their performance
 - The fact that the students did not have to purchase an expensive textbook was liked by the students very much. All the materials were made available to them either on D2L or via student e-mail. The students started performing a bit shaky at the beginning but progressively performed better in tests and quizzes. The overall performance of the students was comparable to the instructor's vast previous experience teaching the same course in a traditional class setting (requiring a textbook) even though no formal data analysis was done in this aspect.

B. Describe lessons learned, including any things you would do differently next time.

- One of the things learned this semester is it is not a good idea to have the two sections combined (calculus-based and algebra-based) even though the basic material is the same, the level of mathematics used is different. This should not be repeated in the future.
- Additionally, we might consider giving some minimal amount of points to students for completing the surveys with the course.

2. Quotes

- Three quotes from students evaluating their experience with the no-cost learning materials. (Note, these are from the survey students took early in the course)
 - "Free online textbooks would be a great alternative to textbooks since the cost of education is already so high and the fact that students are so connected to technology."
 - "The books cost too much in every case."
 - "I usually find reading online resources are harder for me to read and focus on."

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

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

Total number of students affected in this project: 12

- Positive: 60% of 5 number of respondents
- Neutral: 20% of 5 number of respondents
- Negative: 20% of 5 number of respondents

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?

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 overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester of implementation over previous three Fall semesters was positive, see Table 2, below.

Drop/Fail/Withdraw Rate:

33 % of students, out of a total 12 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)

Supporting Data Tables

- Table 1 shows the results of a survey placed in the course early in the semester.
- Table 2 shows the results of select questions from the course evaluation.
- Table 3 displays the grade distribution of PHYS 1111 for four fall semesters.

Table 1: Beginning-Survey Questions

Question	Response % (number)				
	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree
1. The cost of a required textbook influences my decision to purchase it.	20% (1)	0% (0)	20% (1)	20% (1)	40% (2)
2. I prefer to rent my textbooks instead of buying them.	80% (4)	0% (0)	20% (1)	0% (0)	0% (0)
3. Having a free, online textbook would significantly increase my use of the textbook of assigned readings.	20% (1)	20% (1)	20% (1)	20% (1)	20% (1)
4. I prefer having a printed textbook to write in instead of one completely online.	20% (1)	80% (4)	0% (0)	0% (0)	0% (0)
5. I feel most printed textbooks are not relevant to today's college student	0% (0)	20% (1)	20% (1)	20% (1)	20% (1)
6. I have purchased a required textbook that was never used in the course.	60% (3)	20% (1)	0% (0)	20% (1)	0% (0)
7. I prefer to read information from a printed textbook than reading online information.	20% (1)	20% (1)	20% (1)	40% (2)	0% (0)
8. In future courses, I prefer to use free online materials to a printed textbook.	60% (3)	0% (0)	20% (1)	20% (1)	0% (0)
9. I feel I can be just as prepared for a course using free online materials compared to a printed textbook.	40% (2)	40% (2)	0% (0)	20% (1)	0% (0)
10. I am more likely to sign up for a course based on using free online materials as opposed to a printed textbook.	20% (1)	0% (0)	40% (2)	20% (1)	20% (1)
11. I prefer informational videos to printed texts.	20% (1)	0% (0)	60% (3)	0% (0)	20% (1)
12. I prefer accessing materials online so that I do not have to carry a textbook to class.	20% (1)	60% (3)	20% (1)	0% (0)	0% (0)
13. I would prefer that the college roll the cost of the textbook and materials into the tuition or fees.	20% (1)	20% (1)	60% (3)	0% (0)	0% (0)

Table 2 End of Course Evaluation questions

Question	Response % (number)				
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. The required text complements the instructors' lectures/presentations. *	0.0% (0)	0.0% (0)	0.0% (0)	33.3% (1)	33.3% (1)
2. Handouts and/or other audio-visual aids used during the course helped clarify subject matter	33.3% (1)	0.0% (0)	33.3% (1)	0.0% (0)	33.3% (1)

*Of those who responded, one did not answer this question. Therefore, 33.3% did not respond.

Table 3: Grade Distribution

Semester	Grade Distribution in Percent (number)			Dropped Percent (number)
	A, B, or C	D	F	W
Fall 2012	37.5 % (4)	12.5 % (2)	0.0% (0)	62.5% (10)
Fall 2013	35.7% (5)	7.1 % (1)	14.3 % (2)	42.9% (6)
Fall 2014	40.0% (6)	13.3% (2)	13.3% (2)	33.3% (5)
Fall 2015	58.3% (7)	8.3% (1)	8.3% (1)	25.0% (3)

3b. Narrative

This project used both qualitative and quantitative instruments to measure the effectiveness of the project. Qualitatively, a survey was posted in the Brightspace (D2L) course offering at the beginning of the course to find out whether the students preferred a traditional textbook or the OpenStax text and associated materials used in the course. In addition, the survey sorted to find out the likeability of online resources usage, and student opinions as to the likely role the materials might play in their success. Students were encouraged to take this survey by the Project Lead who taught the class. However, it was a self-selecting survey with no points or credit incentives given for taking it. As a result, only 5 of 12 students participated. Table 1, in Section 3a above, displays the results of the Likert-scale questions within the survey.

From this beginning survey, it was revealed that 60% of the respondents disagreed or strongly disagreed that the cost of require textbooks influence their decision to purchase the book. This result is not surprising since 80% strongly agreed that they prefer to rent textbooks instead of buying them. However, it was surprising that there was no clear preference by the respondents as to the statement, "having a free, online textbook would significantly increase my use of the textbook of assigned readings", as each of the 5 response options received 20% of the replies. With regard to a preference to having a printed textbook to write in instead of one completely online, 20% strongly agreed and 80% agreed. In addition, 60% at some level, agreed that they preferred to read information from a printed textbook than reading online information. Furthermore, 60% strongly agreed and 20% agreed that they had purchased a required textbook that was never used in the course. However, the respondents were

equally split as to agreeing or disagreeing that most printed textbooks are not relevant to today's college students. Moreover, only 20% strongly agreed and 60% somewhat agreed to preferring informational videos to printed texts, but 20% strongly disagreed.

An end of course survey containing questions identical, in content, to that in the beginning course survey was placed in a similar manner in the D2L course site. As with the beginning survey, this was a self-selecting survey with no point value toward the course grade given for completion. Unfortunately, none of the students who completed the course chose to participate in the survey. Therefore, the team decided to look at specific questions from the GHC student evaluations of the course. Table 2 contains the questions and responses from the three students who chose to complete this evaluation. The first question was, "the required text complements the instructors' lectures/presentations". Of those who responded, 33.3% disagreed with the statement, 33.3% strongly disagreed with the statement and 33.3% did not respond. The second relevant question was, "handouts and/or other audio-visual aids used during the course helped clarify subject matter". The responses to this question revealed that 33.3% strongly agree, 33.3% not sure, and 33.3% strongly disagree with the statement. The distribution of the responses to these two questions is very concerning to the team. However, the result may be contributed, at least in part, to the fact that the calculus-based and algebra-based physics sections were combined into one class, and the learning objectives of each course were slightly different. In addition, if the students would have taken the post-course survey, the answers may have been different

Quantitatively data was collected in the form of the grade distribution and is displayed in Table 3. This data was for Introduction to Physics for fall 2015, the semester the OER material was used, and the three most recent past fall semesters, namely, fall 2014, fall 2013, and fall 2012. As seen in Table 3, the percentage of students earning grades of A, B, or C during the fall 2015 was 58.3%. This percentage was greater than that of fall 2014, fall 2013, and fall 2012 which had rates of 40.0%, 35.7%, and 37.5%, respectively. In addition, at 25%, the withdraw rate of students during the semester the OER materials were used was lower than that of fall 2014, fall 2013, and fall 2012 which had rates of 33.3%, 42.9% and 62.5%, respectively. While the percentage of students earning a grade of D in fall 2013, 7.1%, was lower than fall 2015, 8.3%, only one student earned this grade in each year. Finally, one student or 8.3% of the students earned a grade of F during fall 2015, this exceed the fall 2012 value of 0.0%. However, the fall 2015 percentage of students earning the F grade was lower than that of fall 2014 and fall 2013 which were 13.3% and 14.3% respectively.

Co-factors that might have influenced the outcomes

As a result of low enrollment, both the Calculus-based and Algebra-based Physics course were taught within the same classroom as if one section. The prerequisite for this course is Pre-Calculus, MATH 1113. Therefore, students' experiences in that course and the length of time between taking PHYS 1111 might have been factors. These are factors the team believes are worth further study.

4. Sustainability Plan

As part of this project, a Master Course was developed for PHYS 1111 with our D2L instance. GHC faculty will be able to request access to course so that they can import it to their D2L course offerings.

At the present time, students and faculty of other institutions can access course information at <https://www.highlands.edu/site/faculty-jlinek-oer-physics>. The team will work with the GHC ALG Library Coordinator, Elijah Scott, to place these materials with a Lib-Guide or other central GHC location for OER materials.

Moreover, the team will meet at least once a year, most likely in June, to examine new or updated materials and establish a timeline for modifying the course. In addition, other faculty and instructional designers will be consulted for additional ideas for continued development and to research the concerns the team has about possible influence of the co-factors mentioned above.

5. Future Plans

The team believes that it would be beneficial to use these materials in PHYS 1111 the next time it is taught and compare the results to those of this initial offering. In addition, the team realized that it might be beneficial for the prerequisite course, Precalculus (MATH 1113), to utilize a free textbook and other materials. Therefore, the team hopes to encourage colleagues in the Division of Mathematics at GHC to look at the outcomes of this ALG grant which involved that course, and its prerequisite. Additionally, the team hopes to redesign Introductory Physics II (PHYS 1112) about OER materials as PHYS 1111 is a prerequisite for that course.

Finally, the team plans to submit a proposal to make a presentation at the 2016 USG Teaching & Learning Conference (April 13-14, 2016) to share our experiences, research, and insight on promoting engaged student learning.

6. Description of Photograph



Left: Dr. Jeffrey Linek, technical and online methodology expert.
Right: Dr. Soumitra Chattopadhyay, Project Lead and content expert.