WILLIAM WOODS
UNIVERSITY

Physics Program Review 2020

Program Review 2020-2021

Physics

Program Profile

History

Start with the history of the program at WWU. Discuss relevant trends and issues dealing with the program and the institution. If a program has one or more concentrations, each concentration should be discussed separately. (300 words or less)

In the early 2000s, with the growing biology program, it became evident that a more robust science curriculum was needed at William Woods University. Bolstering the biology program, full time faculty positions in both physics and chemistry were implemented in the early 2000's and in 2004, a physics minor was added to the science program at WWU (along with a chemistry minor). In 2016, Dr. Vern Hart implemented a new physics B.S. program at WWU in hopes of recruiting more science majors to the university. Unfortunately, Dr. Hart left WWU the following year and his replacement (Dr. Matthew Antonik) left soon after. In fall of 2018, Dr. Sean Baldridge took the reins of the physics program and remains the current (sole) physics faculty position.

While the physics major maintained 1-3 physics majors enrolled in the program throughout its run, in early 2020, the academic council dropped the physics major from WWU's catalog due to low enrollment. Despite not accepting any new students into the program, the two remaining physics majors will be allowed to finish their degree. However, WWU continues to offer a physics minor and the introductory physics courses still serve the biology and exercise science majors.

Program Mission

Provide the mission of the program and describe how the program supports the university mission. Discuss the philosophy or purpose of your program, how the program relates to the mission, vision and goals of the University.

Mission: The primary objective of the physics program is to help students learn to develop and accurately apply mathematical and analytical processes to descriptions and models of systems in the natural world. This is done through hands-on lab work, original research, and traditional coursework. The skills acquired in this program will prepare students to pursue a wide range of technical and scientific careers.

While all students are invited to pursue a minor in physics, the program is primarily focused on bolstering the academic achievement and scientific education of biology majors at WWU as they pursue future endeavors. Many (if not most) biology majors at WWU have concentrations in either pre-vet or pre-med and are seeking graduate or professional programs after graduating from WWU. This is a highly competitive field and students strive to set themselves apart from their peers through superior academic achievement and scholarly endeavors. The pursuit of a physics minor not only provides students with a more robust understanding of the natural world, but it also helps to make themselves more marketable to potential graduate programs by illustrating advanced abilities in problem solving and the mathematical application to science.

Student Demographics

Student Demographic Reflection

Include any additional demographic information used by the program here. Also provide a longitudinal review of program demographic data. What are the trends in the enrollment as well as retention/graduation data. What strategies has the program used in the past 5 years to maintain/improve these numbers?

Over the past 5 years, the physics department at WWU has seen significant turnover which likely contributed to the decline in students pursing a minor in physics. Over the past two years, with a more stable physics faculty situation in place, an increase in physics minors has been observed. While not part of this 5 year review, the Fall 2020 semester saw an enrollment of 9 students in modern physics (a major/minor class only) – more than double the amount in the previous two years.

Recruitment into the physics minor is primarily done in the introductory courses (PHY 201, PHY 212) after an assessment can be performed and high achieving students sought out and encouraged to consider a minor in physics. Many of these students are pre-med or pre-vet and having a minor in physics only serves to bolster their academic achievement as they seek graduate and professional programs following their time at WWU.

William Woods University Assessment Data									
Program: Physics									
		14/15	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	
Declared Majors (as of Oct. 15)	Incoming Freshman			0	1	1	1	0	
	Transfers			1	0	0	0	0	
	Total			1	2	3	3	3	
	Undergraduate Enrollment	1,006	1,001	973	956	934	874	883	-12%
Declared Minors		3	1	21	2	1	3	1	-67%
Graduated Majors					1	0	0		
Graduated Minors		2	10	0	3	1	2		
Retention Rate: IPEDS definition[1]									
University		74.5%	74.5%	77.00%	74.0%	75.90%	77.70%		
Program					100%	0%	100%		
Graduation Rate: IPEDS definition[2]		**08/09**	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	
University		52.4%	51.20%	54.50%	59%	57.50%	75.90%	49.8%%	
Program		NA	NA	NA	NA	NA	NA	NA	
Graduation Rate: Transfer Students[3]									
University		67.4%	69.9%	68.4%	NA	54.10%	55.40%	62.30%	
Program		NA	NA	NA	NA	NA	NA	NA	

[1] = % of full-time, first-time students that return to the institution in the subsequent fall semester
[2] = % of the full-time, first-time cohort that graduate within 6 years
[3] = % of transfer students new to the institution in the fall semester that graduate with a bachelors level degree

Concentrations
Create a chart that provides the student enrollment in program concentrations. Make a column for each year and a row for each concentration for the identified academic years.

N/A

Reflection on Program Enrollment Data

Clearly describe the approach of the program maintain or improve student retention and graduation rates. Does the program have an active plan on retention of current students? if so, specificy the details of the plan.

Regarding program enrollment, the greatest challenge to the physics minor program is recruitment. Convincing eligible students to pursue the minor is done each spring before advising in a three step process:

1. In Physics 2, I spend a few minutes during a February lecture describing the minor and what is required and what to expect if they pursue the next course (Modern Physics). It is clearly articulated that the coursework for a physics minor aligns very well with a B.S. in biology, requiring only an extra 1 or 2 classes for most students.
2. High performing students in Physics 1 and Physics 2 are given a personal invitation by me to pursue a minor reassuring them that they will most likely do very well in the more advanced coursework.
3. Former physics minors are encouraged to recommend the minor to their peers in order to get a student perspective on what the minor entails.

Retention and graduation rates have not yet been an issue with students pursuing the minor. I have not had to fail anyone and among the 13 minors in the past 2.5 years, only 1 has dropped early during Modern Physics. Should I see a change in this trend, I intend to encourage struggling students to attend more office hours and get one-on-one time with me to help them with the material. Indeed, most students who advance that far in the physics program have already discovered the significant advantage that attending office hours provides.

Furthermore, most students who decide to pursue a minor in physics do so in their junior or senior year and retention in their major program is already well established by that point.

Additional Program Resources

If your program has any additional syllabi, handbooks, policies that would be beneficial to an external reviewer and the academic council, please upload here.

Advising

Please describe the advising load, including the average number of advisees for each faculty member within the program. What strategies do program faculty use to achieve successful degree completion and graduation success? How is advising managed by the program faculty?

Dr. Baldridge is the only physics faculty at WWU and currently has 4 advisees (2 physics majors, 2 non-majors).

Internship & Placement

Student Internship Demographics

Use the attached chart or fill in your own data on the students completing an internship during the 5-year timeframe.

N/A

Internship Data Upload

If you did not use the above text box for the internship data, please upload your data here.

Internship Placements

What placements outside of the university are used for internship/practicum/student teaching/clinical experience?

N/A

Graduate Placement Data

Employment in Field

What types of positions are considered relevant to the "Field" of study with this program? Please define what it means for students to be employed 'within the field' of the professional discipline

In general, students who pursue physics enjoy employment in a host of scientific, academic, numerical, and technical fields. Graduates in physics have skills including numerical and data analysis, problem solving, computer programming, and the ability to comprehend and communicate complex ideas. Transcending all those skills, physics majors (and minors) possess a broad understanding of the universe and how it operates on a fundamental level.

Besides the obvious academic and research positions (which are typically only reserved for people with doctorates in physics) physics majors and minors can pursue careers in:

- Engineering
- Healthcare (i.e. medical physics)
- Energy production
- Technology
- Business (many Fortune 500 companies hire physicists as data analysts)
- Software engineering
- Education (High school and middle school science and physics teachers)

A physics minor is well suited to enrich any science, technical, or education degree and the careers that are pursued by graduates of those degrees.

Graduate Placement Data

Please upload your data in the chart provided, either as an attachment or in the text box as a screenshot.

	16-17	17-18	18-19	19-20
Graduate School			1	1
Unknown	8	2		2

Program Curriculum

Curriculum: Rotation
Review enrollment trends by course. Are there particular courses that are not meeting enrollment goals?

PHY 201 (Physics I): Enrollment is typically between 15-30 every semester it is offered. Physics I is a course required for biology and exercise science majors and will remain so for the forseable future, therefore there is no concern about enrollment being maintained. The labs associated with this course follow the same pattern and reasoning.

PHY 212 (Physics II): Enrollment is typically between 15-30 every semester it is offered. Physics II is a course required for some biology and exercise science majors and will remain so for the forseable future, therefore there is no concern about enrollment being maintained.The labs associated with this course follow the same pattern and reasoning.

PHY 315 (Modern Physics): This course is only pursued by students wishing to earn a minor in physics. As such, it follows the same trends as discussed in student demographics (i.e. more declared mionors = more enrollment). The current trend is on the rise following disruptive faculty turnover.

Curriculum: Delivery Mode
Does online enrollment impact campus enrollment? Is there a notable difference in enrolment between online and campus classes, where one is regularly more full than the other?

N/A

Curriculum: Revision
Explain any curricular revisions made since the Ist Program Review. What prompted the changes to curriculum? Were the changes prompted by student learning and assessment data or personnel changes? Did the curriculum changes produce the desired outcomes?

With the change from minor to major and back to minor in the past 5 years, several courses were added to the curriculum and subsequently removed for future semesters (at least after current physics majors graduate).

All courses above PHY 315 (Modern Physics) will be phased out of future semesters as they pertain only to the physics major.

It is suggested that a new 300 or 400 level course will be added to the curriculum (Special Topics in Physics) to accomodate students wishing to explore other physics topics more deeply as an elective. These topics can include mechanics, quantum, electrodynamics, thermodynamics, and numerical methods.

Curriculum: Shared Curriculum
List program courses that are required by other academic programs or that are cross-listed with other academic programs. How do these courses impact the program (ie: increased class size/need for faculty overloads to teach additional sections, ect? How often is the shared course offered? Has the rotation changed for shared classes?

The following courses are listed as general education and also serve as required courses for biology and exercise science degrees. Both courses (and thier respective labs) are offered once a year and the courseload is maintained by Dr. Baldridge. With an increase in enrollment in both the aformentioned programs, a second lab section was added in Fall of 2019 (and all subseqent semesters) to accomodate the number of students.

- PHY 201 (Physics I)
- PHY 202 (Physics I Lab)

- PHY 212 (Physics II)
- PHY 213 (Physics II Lab)

Curriculum Enrollment
Attach the Curriculum enrollment for all program courses.
Physics_Course_Enrollment_Data_.pdf

Program Checklist
Attach the Program checklist from the most recent Academic Catalog
minor_physics_2014_2015.pdf
Physica_Checklist_19_20.pdf

Course Description
Upload program course descriptions from the most current Academic Catalog.

Physics BS

MAT 214 Calculus II 4
A continuation of MAT 124. Further techniques of differentiation and integration, the calculus of exponential, logarithmic, trigonometric, and probability distribution functions, as well as elementary differential equations. Requires extensive use of graphing calculators. Applications to biology, economics, and physics are studied throughout.
MAT 215 Linear Algebra 3
A study of the techniques used in solving linear systems of equations, the properties and theorems associated with vector spaces, determinates and eigenvalues, and linear transformations.
MAT 224 Calculus III 4
A continuation of MAT 214, including solid analytic geometry, vector spaces, matrices, determinants, partial differentiation, multiple integration, and vector calculus.
MAT 312 Differential Equations 3
A study of ordinary differential equations and the following topics: boundary-value problems, Fourier series, and the Laplace transform.
PHY201-Physics I 4
An introductory physics course covering the topics of mechanics, thermodynamics, vibrations, and wave motion with an emphasis on critical thinking and problem solving. Computing software is used to provide interactive instruction and develop connections to the mathematical principals involved. Regular in-class demonstrations are performed and discussed in order to enhance conceptual understanding. Concurrent enrollment in PHY 202 required. (Lab fee)
PHY202-Physics I, Lab 0
The laboratory component of Physics I which reinforces and expands on concepts taught in the lecture. While conducting experiments, students will make observations about physical systems and collect numerical data. Emphasis is placed on identifying patterns and relationships in physical parameters. Students develop hypotheses in order to make predictions and verify presumptions. Formal lab reports are used to summarize relevant findings. Corequisite: PHY 201
PHY212-Physics II 4
A continuation of the introductory physics sequence which covers topics in electrostatics, magnetism, optics, and modern physics. Fundamental concepts from Physics I are described in greater complexity. Students a respected to apply their understanding of energy, mass, force, and inertia to more advanced problems involving atomic systems. Demonstrations and computational simulations are used to increase conceptual understanding. Concurrent enrollment in PHY213 required. (Lab fee)
PHY213-Physics II, Lab 0
The laboratory component of Physics II which reinforces and expands on concepts taught in the lecture. Group experiments are conducted in order to analyze the behavior of physical systems. Emphasis is placed on interpretation

and inference as students are expected to use knowledge from the previous course to explain physical phenomena. Computational interface equipment and graphing software are used extensively. Students design and construct their own experiment on two occasions. Corequisite: PHY 212

PHY315-Modern Physics 3

An upper-division physics course exploring selected topics in contemporary physics, including: quantum physics, atoms, molecules, condensed matter, nuclei, relativity, and elementary particles.

PHY 318 Mathematical Methods in Physics 3

This course provides an overview of applied mathematics in the sciences. Common mathematical functions, transforms, and operations are presented in the context of advanced physics problems. Students will develop a computational framework and a practical problem-solving approach which will assist them throughout the remainder of the major coursework.

PHY 321 Classical Mechanics 3

This course presents an advanced treatment of Newtonian mechanics. Specific emphasis will be placed on developing the Lagrangian and Hamiltonian formalisms. Students will learn to establish complex expressions for potential and kinetic energy terms in order to solve sophisticated equations of motion.

PHY 360 Thermodynamics & Statistical Mechanics 3

This course provides a description of thermal energy on the atomic scale. Boltzmann statistics are used to represent averaged physical properties for individual atoms. The relationship between macrostates and microstates is explore in the contest of quantifiable measurements. Students will develop additional thermodynamic variables, such as enthalpy, in the framework of classical thermal physics.

PHY 381 Electrostatics & Magnetism 3

This course develops an advanced treatise of stationary charged particles. Emphasis is placed on time-independent Maxwell's equations, specifically Gauss' Law, and the static relationship between electric and magnetic fields. Vector operations, such as the divergence and curl, are utilized in representing field lines, strength, and contours. Students will expound on their understanding of classical electrostatic properties, such as resistance and potential, on an atomic scale.

PHY 382 Electrodynamics 3

This course develops an advanced treatise of dynamic charged particles. Emphasis is placed on time-dependent Maxwell's equations, specifically Faraday's Law, and the variational relationship between electric and magnetic fields. Partial differential operators, such as the Laplacian and D'Alembertian, are utilized in representing oscillations. Students will expound on their understanding of classical electrodynamic properties, such as current and flux, on a subatomic scale.

PHY 421 Quantum Mechanics I 3

A foundational course presenting quantum mechanical descriptions of common systems, Students will develop a quantum formalism associated with specific operators. They will solve for eigenvalues and eigenstates, construct wave functions, and explore the meaning of Heisenberg uncertainty and expectation value. Specific emphasis will be placed on finding solutions to the quantum states in the Hydrogen atom.

PHY 422 Quantum Mechanics II 3

An applied course relating the fundamental theories of quantum mechanics to specific physical systems, including subatomic particles. Special emphasis will be placed on solutions of the time-dependent and time-independent Schrodinger equations. Perturbation theory and other variational methods will be applied to heavy atoms and solids.

PHY 450 Advanced Laboratory Methods 3

An advanced laboratory course with an emphasis on student-designed experiments. Students will learn additional laboratory techniques which will assist them in designing, constructing, and performing experiments to measure fundamental physical constants. Students will be expected to use oscilloscopes and bread boards to develop custom circuitry. Programmable interfacing software will be used to acquire, process, and analyze data.

PHY 460 Optics 3

An advanced treatment of light, with specific emphasis placed on its wave-like behavior. A framework will be developed to describe electromagnetic waves using advanced theorems of electromagnetism. Students will investigate the prediction and description of electromagnetic radiation given by Maxwell's equations. Common diffraction patterns and their corresponding transforms will be studied along with Fresnel coefficients and the interaction of light with matter.

PHY 480 Numerical Methods 3

A computational physics designed to help students become proficient with numerical methods commonly used in the sciences. Foundational programming concepts, including iterative and selective execution, data types, and variable declaration will be covered along with specific algorithms. Approaches for simulating physical systems will be presented in the context of solving analytic and approximate equations. Special emphasis will be placed on solving differential and undetermined equations.

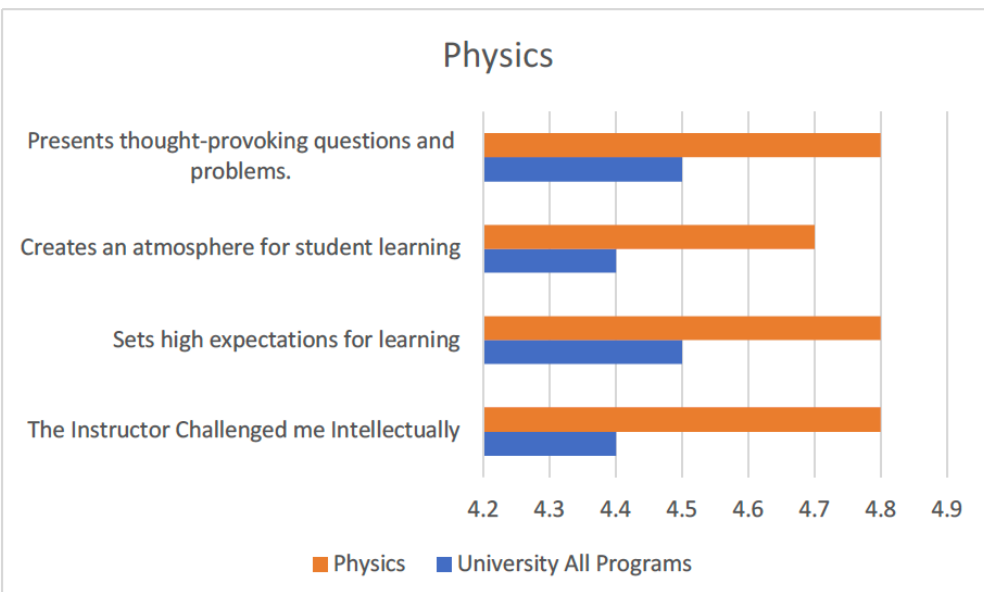
PHY 490 Senior Research Practicum 3

A capstone experience designed to finalize student research conducted throughout the course of the physics program. Students will be guided through the preparation of a senior thesis and will present their findings to a group of their peers. The course will also provide information pertaining to post-graduate career options and graduate degrees in physics or a related field.

Summary of Teaching Effectiveness

This data is compiled by the Office of Institutional Research and is comprised of End of Course evaluation responses of students. The data is comprised of the responses from Q8 "creates an atmosphere for student learning", Q16 "sets high expectations for learning, and Q22 "instructor challenges me intellectually".

Course Evaluation Summary:



Sample:

N=133 53% Response Rate

This data is representative of courses listed on the program checklist. Data from online courses represented in the program begin Academic year 2019-2020 after EOC alignment was created. This data represents end of course surveys from the 2017-2018 through 2019-2020 academic years.

Faculty Response to Teaching Effectiveness

How does this information impact faculty perceptions of classroom management and academic rigor? Will any changes be made resulting from this data? Are there other data available from Student Performance Review or alternative measures pertaining to academic success that can be used to discuss teaching effectiveness?

The results of the survey of teaching effectiveness match well with the goals of the program. Physics *should* be a challenging, but intellectually rewarding, course. At this time, no major changes are being pursued in the way that the current physics courses are being taught at William Woods University.

Faculty & Resources

Physical Facilities

Physical Space/Resources

Describe the physical facilities that are unique to your program, including specialized buildings, classroom space, labs, and built in equipment and how they impact student learning. (If none, put N/A)

Ignoring the significant classroom and laboratory disruptions caused by Covid-19, all physics instruction takes place in the Cox Science and Language Building. Room 104 is typically reserved for physics lecture courses (unless the class is too large) and includes a SMART board that is heavily used by physics faculty. There is also a small physics lab (Room 106) serving the laboratory component of the physics courses. It is a student-oritened laboratory and not a research-oriented laboratory. All instruments and apparatus are designed with education and instruction in mind.

In the physics lab (Cox 106) there are 6 physical desktop computers maintained by UIT which possess software requried to perform physics labs.

Upgrades to Physical Space/Resources

Changes/Upgrades that have been completed within the past 5 years, specifically for your program or are required because of your program along with any impacts to student learning.

N/A

Recommendations to Improve Resources

Describe any desired changes/upgrades to facilities/resources and how the proposed changes would impact student learning.

The most important technological resource related to the lecture portion of physics classes is the SMART board currently installed in Cox 104. Teaching physics is like teaching a science and mathematics course at the same time. Lectures often move from conceptual information delivered through PowerPoint slides to word problems worked out for the students. In order to maintain a smooth and coherent lecture, the ability to write and save onto a PowerPoint slide is pivotal to my teaching method and often praised by my students. As such, the SMART board (or similar device) is crucial to my teaching effectiveness and I request that one be maintained for the physics program in future years. That being said, the current SMART board in Cox 104 is beginning to show its age with dozens of dead pixels and a failing projector bulb. Updating or replacing the SMART board in Cox 104 would greatly benefit the physics program.

Technology Resources

List current technology specific for the program. What technology is used on a regular basis? Are there any technology needs for the program, issues with technology that impact the classroom? Is there technology that would benefit the

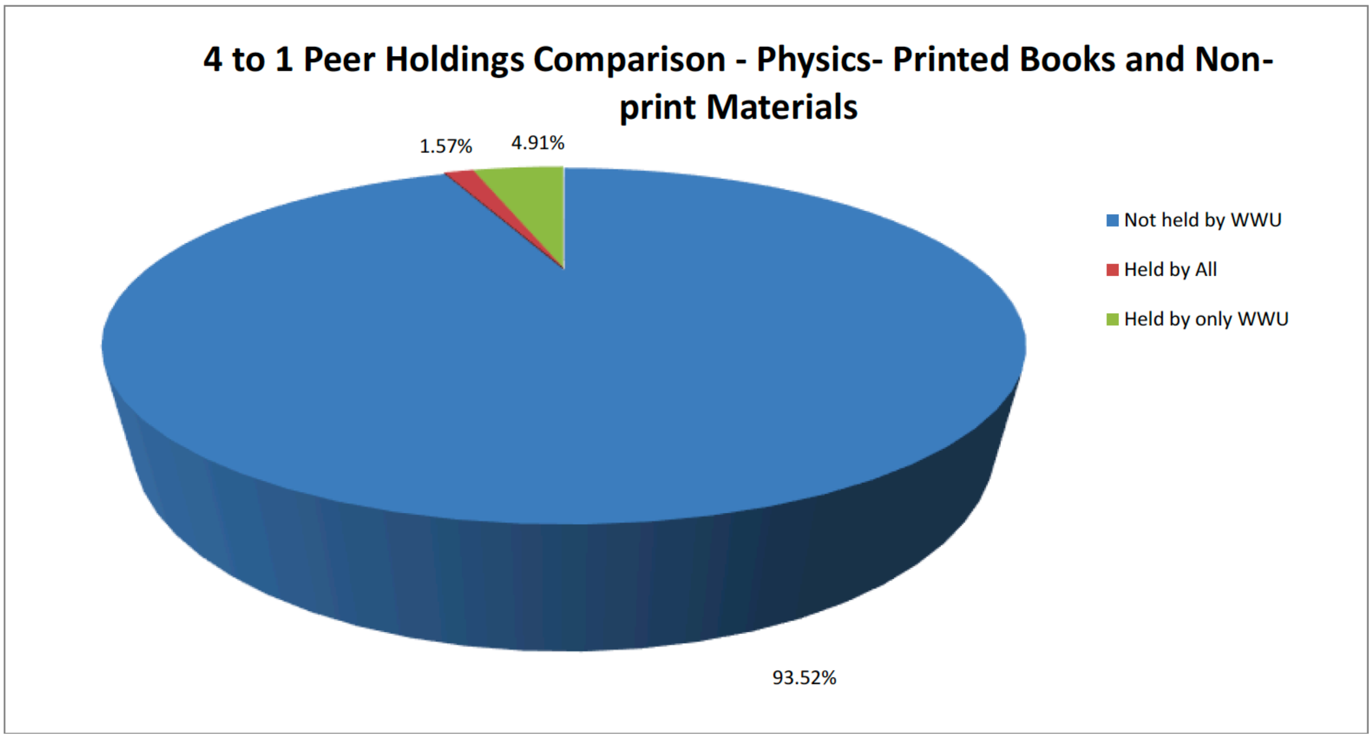
teaching in the classroom that the program would like to investigate?
In the physics lab (Cox 106) there are 6 physical desktop computers maintained by UIT which possess software required to perform physics labs.

Library Report
Attach the complete library report that is provided from the director of the Library that details the available resources to students in the program of study.
Physics_Library_Report_2020.pdf

Library Resources:
Insert the narrative from library staff pertaining to changes and recommendations to program specific library holdings.

III. Comparison with Peer Institutions (4 to 1 comparison)

Libraries Used for Comparison: Stephens College, Columbia College, Westminster College, Central Methodist University



IV. Analysis

Physics as a discipline taught at the undergraduate level requires primarily up-to-date materials. A continued effort is made to acquire materials in both electronic and printed formats. This is not a strong collection as physics was not taught at WWU until the 1990's. In addition, not many monographs are published in this discipline. All books, journal articles and non-print materials are available through *Woods OneSearch.* The Library subscribes to a comprehensive database, *Academic Search Complete,* which is available to all students, both traditional and online.

The library staff acquires any resources that are not available in existing print and digital collections through interlibrary loan.

As in all other disciplines, WWU faculty and students have access to the resources available in MOBIUS member libraries, which includes the superb collections at the large research institutions in the state of Missouri, i.e., the four campuses of the University of Missouri, Washington University, Missouri State University and St. Louis University. Beginning in 2014, access to the resources of the academic, public and special libraries in Colorado and Wyoming became possible through Prospector, a resources sharing partner of MOBIUS. Prospector provides access to an additional 30 million books, journals, DVDs, CDs, videos and other materials, and includes the collections of the libraries at the campuses of the University of Colorado, Colorado State University, University of Denver, and the University of Wyoming. Resources selected from both MOBIUS and Prospector are delivered by courier, thereby reducing the delivery time.

Library Resources:
Faculty response to the adequacy of library resources provided to the program?

Current library resources are adequate for the program and no additional changes are required or requested at this time.

Faculty and Staff Resources

Faculty
1-list all full time faculty in the program with highest degree, degree granting institution, years of full-time teaching experience WWU, and contractual course load. 2-List adjuncts who have taught within the last 3 years with the same qualifying information and which courses they have taught.

WWU maintains one full time physics faculty (contracted with 12 hour course load) and no adjuncts.

Current Physics Faculty:

Sean Baldridge, PhD in Physics from the University of Missouri.

2.5 years full time teaching experience at William Woods University (started Fall 2018)

Faculty Curriculum Vitae
Attach current Vitae for all full time Faculty
Sean_Baldridge.pdf

Adjunct Faculty Curriculum Vitae
Attach current Vitae for all adjunct faculty in the program.

How many staff are designated to support the program?

1

Staff
Do you feel the program is adequately staffed in order to meet the goals of the program?
Yes (selected)
No

Staff
Are issues with staffing impacting student learning?
Yes

No (selected)

Faculty Percentage of Courses Taught by Full-time vs. Part-time
Please include a chart of the number of classes taught within the program that are taught by full time and part time faculty. Please include academic years Fall 2013 through Spring 2018

100% of courses are taught by full-time faculty.

Faculty Reflection on Teaching Load Distribution
Please discuss the distribution of courses between full time and part time faculty. What impact if any does this have on students and/or the curriculum?

N/A

Recommendation on Personnel
What recommendations to personnel (Faculty/Staff) do the program faculty recommend? What is the rationale for the recommendation?

It is recommended to maintain the current faculty positions in order to meet the needs of the program.

Financial Analysis of the Program

Cost Per Major
This number is from the Academic Dean Report on Program Prioritization.

Financial Analysis by Program
Discuss issues and implications of the program budget. – need more description here to allow for a review of the financial cost of the program. I would like to add a prompt for programs to also report on their program cost per credit hour provided, in many cases this will look totally different to the cost per major, but still provides an alternate route to view the financial cost of a program.

The physics minor is supported by the physics and physical science budget of $3000 per year to support classroom and laboratory expenses as needed.

Instructional Expenses
Discussion of expenses related to instruction. i.e. Internship, clinical, practicums…

All expenses for the physics minor relate to instructional materials required for classroom and laboratory needs. Primary sources of expenses are lab materials. While physics labs do not require a lot in the way of consumables (i.e. chemicals), other expenses are required in the form of new lab apparatus, tools, updating lab equipment, software licsenses, and the need to replace broken or damaged equipment on occasion.

We currently maintain 4 working lab stations in the physics lab and each station requires identical apparatus and tools. The majority of physics labs require the use of sensors to measure the observable quantities needed for labortory expercises. These sensors are primarily bought from PASCO Scientific in order to integrate into PASCO's sensor interface with the computer (that we currently own). The computers are physical (i.e. not a virtual box) and supposed to be maintained by UIT. In addition to sensors, each lab station must have working apparatus components (i.e. tracks, carts, pullys, voltage sources, etc.) that must be maintained.

Most of the sensors and apparatus were already own by WWU when the currently faculty came on board, however it was neccesary to update the PASCO sensor apparatus in 2019 to a more robust unit. In the past 3 years, this was the most recent and largest expense incured by the program to the amount of $2000. Most other expenses are below $100 per item.

Non Instructional Expenses

Expenses that are included in the budget but not part of the instructional aspect of the program, not all programs have this.

N/A

Assessment Planning

University Objectives

Use the Attached copy of the University Student Learning Outcomes and discuss the alignment of your program to these objectives. How do the courses in your program support and contribute to expanding students' knowledge.

Major Field Competence and Lifelong Education: The physics minor serves to bolster any student major through rigorous application of logic and mathematical techniques toward understanding the Universe at a fundamental level. Learning how to solve physics problems gives students skills in solving problems methodically in order to find unique and workable solutions to any type of situation. Laboratory courses are designed in a way that encourages student discovery and challenges several common misconceptions of the world around them in order to promote the joys of academic (and scientific) discovery.

Ethics: One of the most difficult challenges of teaching physics (and likely most subjects) is the prevalence of one student copying another's work. It is very tempting to borrow a friend's homework and copy it – especially when it is the same problem with the same solution. The students in physics quickly realize that this only serves to shoot themselves in the foot. They learn that homework is not something meant to keep them busy and supply gradable material. Homework is *practice*. If a student copies another's work, they don't get the practice and they quickly learn it leads to failure. Copying another's work in an eventual job will quickly lead to much more devastating consequences and it is an important lesson that I try to reinforce.

Self-Liberation: Physics in general is perceived as a difficult academic pursuit. In mastering the coursework and graduating with a minor in physics, students must apply themselves in ways that often are new to them. For example, spending 2 hours on one difficult physics problem and not giving up teaches perseverance and helps to reveal a student's true potential and what can be achieved through hard work. Getting a correct solution to a difficult problem builds self confidence in a student's ability.

Institutional_Learning_Outcomes.docx

Program Outcomes

Identifier	Description
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.

Additional Standards/Outcomes

Identifier	Description
PHY.1	Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.

PHY.2	Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.
PHY.3	Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.
PHY.4	Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

Program Assessment Matrix
Please insert a chart that shows the matrix for your program assessment plan/report.

Assessment Matrix
If your program already has a working document for the program matrix, please upload it here. No need to reproduce it in the text box.

Program Assessment Matrix (Physics Minor)

A–Assessed R–Reinforced I - Introduced M - Mastered

Course	Course Description	Objective PHY.1	Objective PHY.2	Objective PHY.3	Objective PHY.4
PHY 201	**Physics I** *Introduced to mechanics, fluid dynamics, and thermodynamics*	A, I		I	
PHY 202	**Physics I Laboratory**	A, I	I		
PHY 212	**Physics II** *Introduced to sound, light, optics, electricity, and magnetism*	R		I	
PHY 213	**Physics II Laboratory**	R	A, I		
PHY 315	**Modern Physics** *Introduced to relativity and introductory quantum mechanics*	A, M			I
MAT 124	**Calculus I** *Introduced to differential and integral calculus*			R	

Assessment Data

Annual Assessment Report 2019-2020

Physics_Annual_Assessment_2019_2020.pdf

Annual Assessment Report 2018-2019

Physics__Annual__Assessment_2018_2019.pdf

Annual Assessment Report 2017-2018

Annual Assessment Report 2016-2017

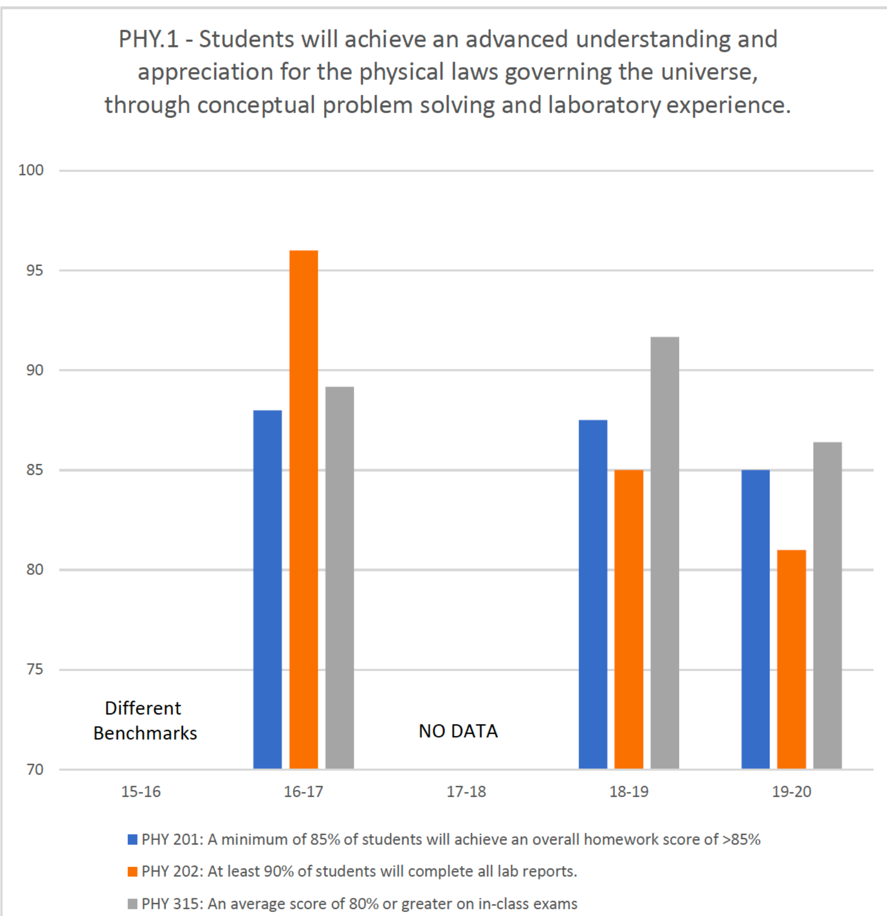
Physics_Annual_Assessment_2016_2017.pdf

Annual Assessment Report 2015-2016

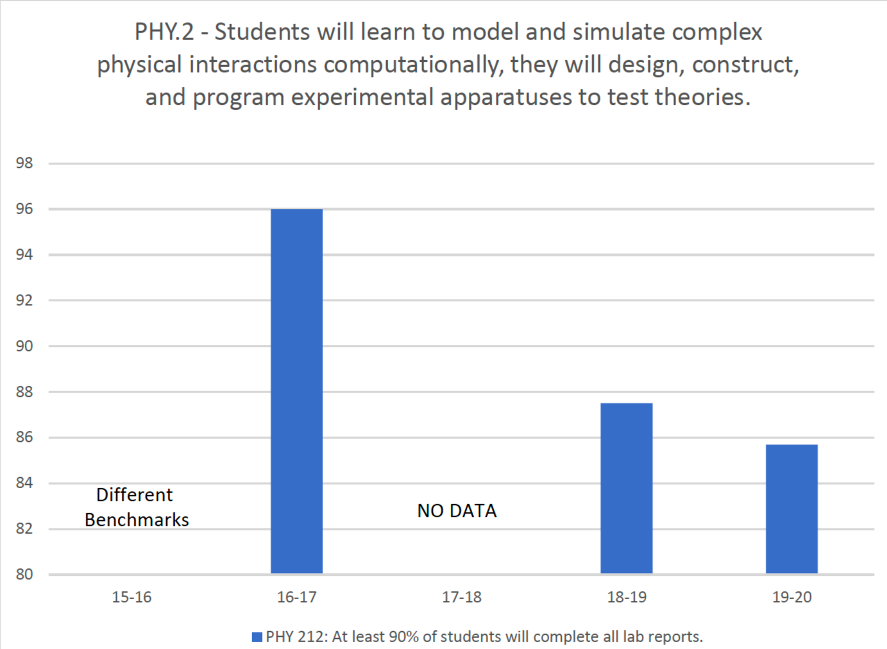
Physics_Minor___Annual_Assessment_Report_2015_2016_1_.docx

Snapshot on Assessment (5-year)

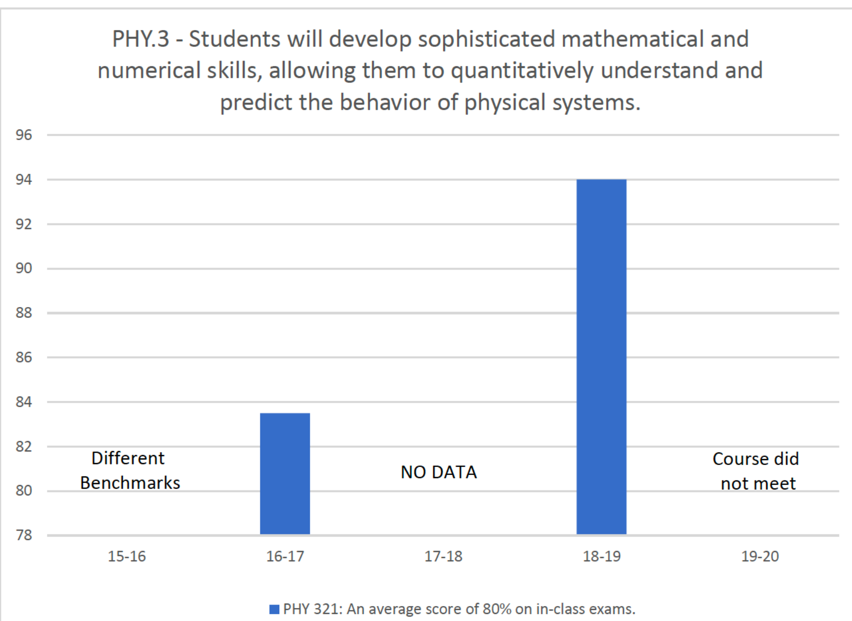
Please refer back to the program Annual Assessment report and create a graph showing a 5-year trend on assessment data for your program objectives. This should show a quick view of how programs are meeting or not meeting set benchmarks from student assessment. Each objective should have its own graph in order to keep it organized and easy to track. Each graph should have a short narrative explaining what is happening with the data and what implications that has on the program and student learning.



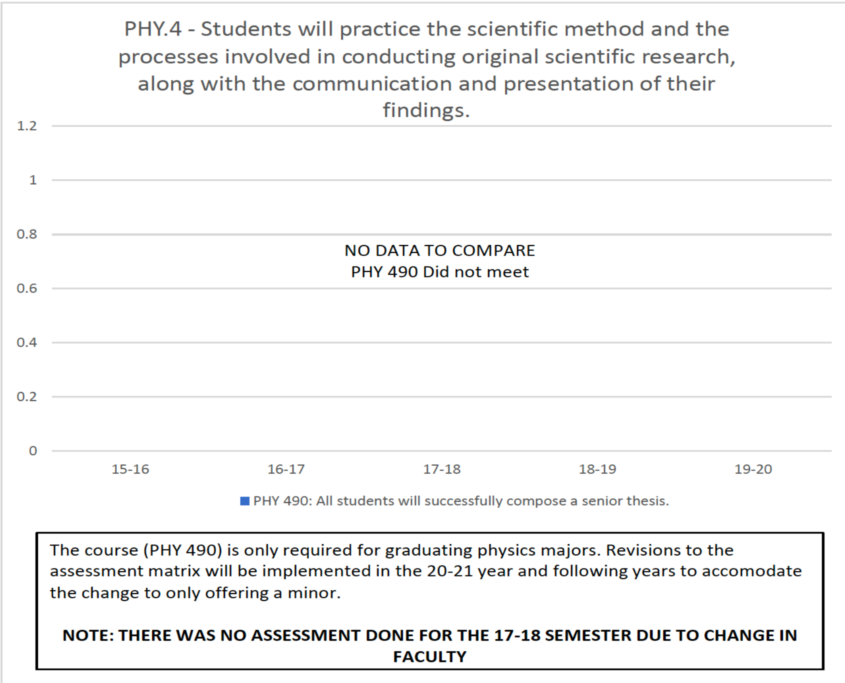
A general downward trend is noticed in lab report participation. This may be in part due to faculty change and different requirements in the lab. Future revisions to the course will include more emphasis on ensuring students complete all lab reports. All other criteria are generally consistent.



Similar to PHY 202, A general downward trend is noticed in lab report participation. This may be in part due to faculty change and different requirements in the lab. Future revisions to the course will include more emphasis on ensuring students complete all lab reports.



The course (PHY 321) meets every other year and is only required for physics majors (not minors). Revisions to the assessment matrix will be implemented in the 20-21 year and following years to accomodate the change to only offering a minor.



Analysis on Assessment
What is the assessment process for the program overall? What general activities are used to collect assessment information? Are all faculty involved in the assessment process?

The assessment of the physics program in its current state is primarily focused on completion of work and exam grades. Additionally, some of the criteria is only pertinent to physics majors and a revision to the assessment matrix is required. This revision will be implemented for the 20-21 academic year and will be reflected on the next program review. Emphasis will be placed on more aspects of the coursework and an increase of assessment based on exam and project performance will be implemented.

In the opinion of the physics faculty, none of the assessment findings were of significant alarm. There has been a decrease in laboratory participation, however some of that is due to the pandemic and everything moving online in the last semester (Spring 2020).

100% of physics faculty are involved in the assessment process (there is only one).

Conclusions and Recommendations

Program Response to the External Review Report

Response
Please respond to all scores of a "Needs Improvement" or "Not Evidenced" made by the reviewer. Please note in the text which question you are discussing and then proceed with the response. Be thorough in your response.

N/A

Minors do not have external reviewers.

Program Identified Strengths

Discuss strengths of the program as they impact student learning.

The greatest strengths to the physics program are the students who pursue the minor. Their interest and enthusiasm for the subject motivate me to give them the most complete and enjoyable experience possible. They are what keeps the program alive and are the most important asset for recruitment as they can attest to their peers their personal experiences in the program.

Program Identified Challenges

Discuss any challenges of the program as they impact student learning. What is the program doing to combat these challenges?

Enrollment remains the greatest challenge to the physics program. Physics is often perceived as difficult and many students dread the course. Convincing students to take more physics courses than is required by their major is a difficult task. A significant aspect of student recruitment into the physics minor hinges on the perception of the physics faculty and how their previous experiences have been. Students must make the decision, “Do I want to take another semester with this guy?”. This is a challenge to me personally as the sole physics professor at the university. My courses must be challenging in order to maintain a proper level of academic rigor, but also engage the students in a way that is enjoyable.

The unenjoyable aspects of physics (homework and exams) are unavoidable, but I have found that making the laboratory experience ‘fun’ has the greatest impact on convincing students to going further in the program. It is during labs that I get to know the students best, as I get to watch them work through challenging problems “live and in person”. This is also the best place for a rapport to develop between student and professor as I can interact with students on a more personal level (outside of office hours). In my opinion, this rapport is the largest contributor to students wanting to pursue the minor. Unfortunately, the current state of the university due to the pandemic has put severe limitations on the typical laboratory setting and I fear a decline in physics minors declared in the coming year. It has been more difficult making a connection with the students in order to convince them to pursue the minor.

Action Plan

What is the plan for the program moving forward. What anticipated changes will be implemented as a result of this report?

The most significant change to the program is the removal of the physics major and only having a minor offered at WWU. This will require revisions of assessment procedure for the program moving forward. I am also wanting to add additional cross curriculum collaborations with other programs to illustrate how physics is intertwined into many aspects of our lives. Otherwise, the physics program will continue with its five primary courses and an effort on recruiting minors into the program will continue.

Academic Council Review

Academic Council Evaluation for Program Review

3=Exemplary   2=Adequate   1=Needs Improvement 0= Not Evidenced

Program Profile		
1.1	History of the program is succinct, but detailed. (-300 words)	3
Comments: The report conveyed the history of the Physics program from a minor to a major, back to a minor in a clear way with facts and direct phrasing.		
1.2	Program's purpose/mission is clear, including relationship to the university's mission statement.	2
Comments:		
1.3	Clearly describes the approach to maintain or improve student retention and graduation rates.	2
Comments:		
1.4	Program has clearly defined strategies for retention and graduation rates of students.	2
Comments: Using the introductory courses that are General Education and connected to the Biology majors is a good way to pull in more students.		
1.5	Program advising loads are appropriately delegated throughout the program	2
Comments: The advising load is small, so not hard to accurately advise students.		
1.6	Program has clearly articulated advising processes followed by all faculty within the program.	2
Comments:		
1.7	Comprehensive accounting of graduates in internship placements	2
Comments: This is a minor program		
1.8	Provides detailed description of possible employment positions for graduated students.	2
Comments:		
1.9	Post-graduation data is complete and provides a picture of where students go after graduation.	2
Comments: Missing data due to faculty turnover		
Curriculum		

2.1	Course rotation is followed in the way courses are offered with minimal tutorial/independent study courses.	2
Comments:		
2.2	Reflection on course offerings and enrollment of courses, rotation, and demand.	2
Comments:		
2.3	Course offerings appear appropriate for the needs of the program.	2
Comments:		
2.4	Discussion on curriculum changes based on assessment are clearly explained and complete	2
Comments:		
2.5	Teaching effectiveness summary within the program is detailed and faculty respond to successes and deficiencies within the evaluation.	3
Comments:		
2.6	Course descriptions are detailed and specific. They reflect the levels of rigor identified by Curriculum Committee in their descriptions. (100-400 level)	2
Comments:		
Physical, Human, and Financial Resources		
3.1	Summarizes all physical equipment needs and supplies noting any deficiencies and the impact on student learning.	3
Noted the need of a new SMART board in COX 104 and noted upgrades that were recently made to the lab equipment (PASCO sensor apparatus)		
3.2	Summarizes the physical space available to the program	2
Comments: Noted the limitations on the program based on the physical structure of the building housing the program.		
3.3	Summarizes the Technology equipment needs and supplies noting any deficiencies and the impact on student learning.	3
Comments: Noted the need of a new SMART board in COX 104 and noted upgrades that were recently made to the lab equipment (PASCO sensor apparatus)		

3.4	Provides summary analysis of library holdings, noting specifically how deficiencies, if any, affect student learning	2
Comments:		
3.5	Faculty qualifications and specific competencies are fully and accurately described	2
Comments:		
3.6	Provides a sound rationale for current staffing and/or future recommendations related to student learning.	2
Comments:		
3.7	Provides rationale and recommendations to improve resources that would address such deficiencies and link student learning.	2
Comments: Noted the need of a new SMART board in COX 104 and noted upgrades that were recently made to the lab equipment (PASCO sensor apparatus)		
3.8	Provides sound rationale on the financial aspects of the program. Reflects on the cost per major and fiscal needs of the program.	2
Comments:		
Assessment		
4.1	Includes University learning outcomes and assessment measures, which are clearly explained.	2
Comments:		
4.2	Includes Program learning outcomes and assessment, which are clearly explained.	2
Comments:		
4.3	Standards for performance and gaps in student learning are clearly identified with action plans for improvement if needed.	2
Comments: Outlined issues and successes in detailing the assessment data. Some gaps in the data due to turnover, as well as changes in benchmarks.		
4.4	The student learning objectives are appropriate for the specific discipline.	2
Comments: Some discussion on the determination of the specific task – "submitting lab reports" not sure if this gets to the skills in the lab reports, or is a submission component only?		

4.5	Includes a longitudinal view of assessment for each program learning outcome	3
Comments: Provided easy to read data when available. Discussed the future assessment after the transition to back to a minor program moving forward for the 20-21 academic year.		
4.6	Discussion on the assessment process over the 5-year span.	2
Comments: Objective 3 and 4 are not noted in the Assessment Matrix as being assessed, but in the 5-year snapshot there is data for Objective 3. Objective 4 was connected to a course that did not meet in the 5-year span.		
External Review		
5.1	Program response to all criteria marked as a 2 or lower on the External Review report is complete with specific strategies for improvement.	NA
Comments:		
5.2	Response to the external review is complete and detailed	NA
Comments:		
Conclusion		
6.1	Strengths of the program are discussed	2
Comments: Faculty comments ere are accurate and on target.		
6.2	Challenges of the program are discussed.	3
Comments: Faculty understands the challenges and is working to overcome student's hesitation at taking additional physics courses.		
6.3	Action plan for the program is visionary, showing evidence that the program is aiming for a higher level of student learning.	2
Comments:		

Noted strengths of the program:

The lead faculty for the program is very aware of the strengths and weaknesses and is willing and able to work with students to garner more interest in courses beyond the General Education offerings. The faculty is flexible in meeting student needs and offers courses that are challenging while keeping students' interest in the content. Student surveys pertaining to rigor and academic challenge show that students recognize and credit the program for being rigorous. It is also challenging to meet the needs of a program as a one-person department, but the faculty does it well.

Noted challenges of the program:

The program would benefit from additional technology and resources as it is challenging to complete challenging labs in the small room that is assigned and with the minimal budget. This is one of only a few quantitative programs on campus and so it I hard to develop a community of learners for student engagement inside and outside the classroom. As a one man show it is difficult to meet the needs of students and faculty responsibilities. The faculty also teaches outside of the physics content, so he is spread thin.

Recommendations moving forward:

The faculty member needs to be more vocal about financial and technological needs within the program. Don't be afraid to ask and get it in the discussion. When reviewing the minor look at ways to create flexibility in the curriculum to meet student and faculty needs. Other smaller minors use 300-400 Issues courses as rotational topics courses that allow for the flexibility of plugging in a course or interest or timely topic without being tied to a rigid curriculum.

Appendix

Course Enrollment Data:

Course	Title	Required Courses - 59 credits									
		2016-2017		2017	2017-2018		2018-2019		2019	2019-2020	
		Fall	Spring	Summer	Fall	Spring	Fall	Spring	Summer	Fall	Spring
MAT 214	Calculus II	1/30	NA	NA	NA	7/30	NA	NA	N/A	N/A	7/30
MAT 215	Linear Algebra	NA	NA	NA	NA	NA	NA	NA	N/A	10/25	N/A
MAT 224	Calculus III	1/20	NA	NA	NA	NA	NA	4/25	N/A	N/A	N/A
MAT 312	Differential Equations	NA	NA	NA	NA	NA	9/30	NA	N/A	N/A	7/30
PHY 201/202	Physics I & Lab	25/30	NA	NA	17/30	NA	17/30	NA	N/A	27/30	N/A
PHY 203	Physics Lab Transfer	NA	NA	NA	NA	NA	NA	NA	N/A	N/A	23/30
PHY 212/213	Physics II & Lab	NA	25/30	NA	NA	7/30	NA	16/30	N/A	N/A	23/30
PHY 315	Modern Physics	9/20	NA	NA	3/20	NA	3/20	NA	N/A	4/20	N/A
PHY 318	Mathematical Methods in Physics	NA	2/20	NA	NA	NA	NA	3/20	N/A	N/A	N/A
PHY 321	Clasical Mechanics	1/20	NA	NA	1/20	NA	1/20	NA	N/A	N/A	N/A
PHY 360	Thermodynamics & Statistical Mechanics	NA	2/20	NA	NA	NA	NA	2/20	N/A	N/A	N/A
PHY 381	Magnetism	NA	NA	NA	NA	NA	NA	NA	N/A	2/20	N/A
PHY 382	Electrodynamics	NA	NA	NA	NA	1/20	NA	NA	N/A	N/A	2/20
PHY 421	Quantum Mechanics I	NA	NA	NA	NA	1/20	NA	NA	N/A	N/A	N/A
PHY 422	Puatum Mechanics II	NA	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A
PHY 450	Methods	NA	NA	NA	NA	NA	NA	NA	N/A	N/A	N/A
PHY 460	Optics	NA	NA	NA	NA	1/20	NA	NA	N/A	N/A	2/20
PHY 480	Numerical Methods	1/20	NA	NA	NA	NA	NA	NA	N/A	2/20	N/A
PHY 490	Practicum	NA	NA	NA	NA	1/20	NA	NA	N/A	N/A	N/A

Physics Minor 2014 Checklist

PHYSICS MINOR – 20 credits **2014-2015 Catalog**

ID#:______________

Name:____________________________________ **Advisor:_________________________**

*****Students are required to have 122 distinct credits for graduation*****

REQUIRED COURSES 16 credits

Course	Credit	Semester Completed	Grade Earned	Substitutions
MAT124 Calculus I	5			
PHY201 Physics I	4			
PHY202 Physics Lab	0			
PHY212 Physics II	4			
PHY213 Physics II Lab	0			
PHY315 Modern Physics	3			

REQUIRED Electives 4 credits

Course	Credit	Semester Completed	Grade Earned	Substitutions
One (1) of the Following:	**4**			
CHM114 General Chemistry I	4			
CHM115 General Chemistry I Lab	0			
MAT214 Calculus II	4			

Student:____Date:__________________

Advisor:____Date:__________________

Division Chair:____________________________________Date:__________________

Substitutions to the coursework above requires the signature of the division chair.

Updated March 31, 2014

Physics Checklist 2019-2020

Checklist

Physics - 20 Credits	2021 Catalog
ID#:	
Name:	
Advisor:	

****Students are required to have 122 distinct credits for graduation****

Required Courses:17.00 credits

Course	Course Title	Credit	Semester Completed	Grade Earned	Substitutions
MAT 124	Calculus I -M	5.00			
PHY 201	Physics I -N	4.00			
PHY 202 or PHY 203	Physics I Lab or Physics I Lab for transfer students	0.00 or 1.00			
PHY 212	Physics II -N	4.00			
PHY 213	Physics II Lab	0.00			
PHY 315	Modern Physics	3.00			

Required Electives: 4.00 credits

Required Electives: Required Elective - 4 Credits

Credits:4.00

Certification Course	Credit	Semester Completed	Grade Earned	Substitutions
CHM 114 General Chemistry I -N	4.00			
CHM 115 or CHM 116 General Chemistry I Lab or General Chemistry I Lab transfer st	0.00 or 1.00			
MAT 214 Calculus II	4.00			

Signatures:

Student:	Date:
Advisor:	Date:
Division Chair:	Date:

Faculty Vitae

CURRICULUM VITAE: SEAN P. BALDRIDGE

CONTACT INFORMATION

Home Address:
1404 Carolina Dr.
Columbia, MO 65202
Tel: (225) 802-0145
Email: sean@sbaldridge.com
Website: sbaldridge.com

EDUCATION

Ph.D. in Physics,	University of Missouri, Dec 2017
B.S. in Physics,	University of Missouri, May 2011

EMPLOYMENT

Teaching Assistant	Aug 2011 - Dec 2017
Undergraduate Researcher	May 201O - Aug 2011

GRANTS

Pending

NSF IUSE (EHR): **$598,000;** "Simulated Experiments in Astronomical Learning (SEAL)", PI: Sean Baldridge (09/01/2018 - 08/31/2021)

HONORS AND AWARDS

Harry Hammond award for excellence in teaching, 2016

TEACHING

Introduction to Laboratory Astronomy (ASTRON 1020, University of Missouri) 13 semesters, 2011 to 2017

RESEARCH INTERESTS

Late-stage stellar evolution (AGB to Planetary Nebula) Circumstellar molecule formation, destruction, and survival Development of astronomical simulations for educational use

Publications: *Refereed publications and* conference *proceedings*

Baldridge, S.; Speck, A., "NGC 2392: Cometary Knots without H_2 Emission", 2018, Submitted to MNRAS, Dec 2017 (pending)

Ruzhitskaya, L.; **Baldridge, S.;** Montfrooij, W., "Visual explanations behind important equations in astronomy", 2017, European Journal of Physics, 38(2), 025604

Ruzhitskaya, L.; Speck, A.; Ding, N.; **Baldridge, s.;** Witzig, S.; Laffey, J., "Going Virtual... or Not: Development and Testing of a 3D Virtual Astronomy Environment", Communicating Science: A National Conference on Science Education and Public Outrea ch., 2013, p.255

Case, G. L., **Baldridge, S.,** et al., "GBM Monitoring of Cyg X-1 During the Recent State Transition", 2011, 2011 Fermi Symposium, eConf C110 509.

Posters

Baldridge, S.; Speck, A.; Matsuura, M., "Near IR Spectroscopic Analysis of Molecular Hydrogen in the Dumbbell Nebula (NGC 6853)", 2014, American Astronomical Society, AAS Meeting #223, #353.10

Baldridge, S.; Speck, A.; Matsuura, M.; Jacoby, G., "Clumpy Molecular Hydrogen in the Dumbbell Nebula", 2013, American Astronomical Society, AAS Meeting #221, #249.

William Woods University - Dulany Library
COLLECTION ANALYSIS
September 2020

In Support of the Following Academic Program: Physics

I. **MOBIUS Holdings** (Subject Search):

- Physics – 28,348 entries
- Mechanics – 16,869 entries
- Astronomy – 11,180 entries
- Physical sciences – 2,134 entries
- Thermodynamics – 3,612 entries
- Magnetism – 1,487
- Electricity – 3,806

II. **William Woods University Holdings**:

Ebooks

- Physics – 514 entries
- Mechanics – 140 entries
- Astronomy – 251 entries
- Physical sciences – 29 entries
- Thermodynamics – 85 entries
- Magnetism – 43
- Electricity – 55

Journals (Print and full-text)

- Physics (167)
- Nuclear physics (14)
- Astronomy (7)
- Geophysics (5)
- Biophysics (3)
- Electronics (3)
- Mathematical physics (3)
- Mechanics (2)
- Molecular physics (2)
- Plasma physics (2)
- Acoustics and sound (1)

Applied physics (1)
Medical physics (1)

Streaming Video

Physics – 287 entries
Mechanics – 146 entries
Astronomy – 231 entries
Physical sciences – 353 entries
Thermodynamics – 38 entries
Magnetism – 46
Electricity – 84

Books, Visual Materials

By Publication Date

Subject	Totals	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Acoustics, Sound Totals	3	1	1	1	0	0
Acoustics, Sound - General Works	2	1	1	0	0	0
Sound Waves	1	0	0	1	0	0

Subject	Totals	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Analytical Mechanics Totals	11	1	2	0	3	1	2	1	1	0
Analytical Mechanics	9	1	2	0	2	1	1	1	1	0
Dynamics. Kinematics	2	0	0	0	1	0	1	0	0	0

Subject	Totals	1800-1849	1850-1899	1900-1909	1910-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019	Other
Astronomy Totals	153	1	1	0	0	0	0	2	5	14	9	15	48	19	18	12	8	1
Astronomical Instruments, Photography, Photometry	10	0	0	0	0	0	0	0	0	2	1	3	2	2	0	0	0	0
Astronomy	6	0	0	0	0	0	0	0	2	0	1	0	2	0	0	0	1	0
Astronomy, General - Star Catalogs, Observations	21	1	0	0	0	0	0	1	1	1	3	1	6	1	5	0	0	1
Astrophysics - Nuclear, Plasma, etc.	7	0	0	0	0	0	0	0	0	2	0	2	1	0	1	0	1	0
Comets, Meteors, Meteorites	3	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
Cosmogony & Cosmology	19	0	0	0	0	0	0	0	0	0	0	1	6	3	3	4	2	0
Descriptive Astronomy, General. Space Sciences	5	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0
Extraterrestrial Life	6	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	1	0
Galaxies, Quasars	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Geodesy, General	2	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
History, Biography	14	0	0	0	0	0	0	0	1	1	1	0	6	2	0	1	2	0
Planetary Studies	16	0	0	0	0	0	0	0	0	0	0	1	4	3	4	3	1	0
Popular & Juvenile Works, Elementary Textbooks	12	0	0	0	0	0	0	0	0	1	1	2	2	3	1	2	0	0
Practical & Spherical Astronomy	9	0	1	0	0	0	0	0	1	2	0	1	2	1	1	0	0	0
Solar Studies	7	0	0	0	0	0	0	0	0	2	0	2	2	1	0	0	0	0
Stellar Studies	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0

Subject	Totals	1800-1849	1850-1899	1900-1909	1910-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019	Other
Study & Teaching, Observatories & Planetariums	10	0	0	0	0	0	0	1	0	1	0	0	6	1	1	0	0	0
Types of Stars, incl. Black Holes, Neutron Stars	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0

Subject	Totals	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019	Other
Constitution & Properties of Matter Totals	48	1	2	4	9	8	5	8	6	4	1
Atomic Physics, Constitutions & Properties	14	1	1	1	3	4	1	2	1	0	0
Gravitation	2	0	0	0	1	0	1	0	0	0	0
Quantum Theory. Field Theories	9	0	0	0	0	0	1	2	2	4	0
Relativity	12	0	0	0	3	3	2	3	1	0	0
Special Properties of Matter	2	0	0	1	0	0	0	1	0	0	0
Statistical Physics	5	0	1	1	1	0	0	0	2	0	0
Surfaces, Thin Films, Solid State Physics	4	0	0	1	1	1	0	0	0	0	1

Subject	Totals	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Electricity, Magnetism, Nuclear Physics Totals	53	2	5	3	7	16	3	10	4	3
Electric Current. Electrodynamics	2	0	0	0	0	1	0	0	0	1
Electric Waves	3	0	1	0	1	0	0	1	0	0
Electricity, General	5	0	0	0	0	2	0	0	2	1
Electrostatics	2	0	0	1	1	0	0	0	0	0
Magnets & Magnetism	12	0	1	1	2	2	0	5	1	0

Subject	Totals	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Nuclear Physics	22	2	3	1	2	8	2	2	1	1
Plasma Physics	5	0	0	0	1	2	0	2	0	0
Superconductivity	2	0	0	0	0	1	1	0	0	0

Subject	Totals	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Heat Totals	18	1	0	1	2	3	6	0	2	2	1
Heat	1	0	0	0	0	1	0	0	0	0	0
Heat - General Works	3	0	0	0	0	0	3	0	0	0	0
Heat Transfer	2	0	0	0	0	2	0	0	0	0	0
High Temperature Physics	1	0	0	1	0	0	0	0	0	0	0
Low Temperature Physics	1	0	0	0	1	0	0	0	0	0	0
Thermodynamics	9	1	0	0	1	0	2	0	2	2	1
Thermometers & Thermometry	1	0	0	0	0	0	1	0	0	0	0

Subject	Totals	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019
Optics, Light, Radiation Totals	22	1	1	3	4	7	1	5	0	0
Geometrical Optics	3	0	0	0	1	2	0	0	0	0
Holography	1	0	0	0	1	0	0	0	0	0
Optics - General Works	10	1	0	2	2	3	0	2	0	0
Physical Optics	1	0	0	0	0	0	1	0	0	0
Quantum Optics	1	0	0	0	0	1	0	0	0	0
Radiation Physics - Luminescence, X-rays, Color	3	0	0	1	0	1	0	1	0	0
Spectroscopy, Theoretical - General	3	0	1	0	0	0	0	2	0	0

Subject	Totals	1910-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2004	2005-2009	2010-2014	2015-2019	Other
Physics, General Totals	109	1	0	0	0	4	13	7	6	44	11	12	6	2	3
Dictionaries & Encyclopedias	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0
History, Biography, Early Works	25	0	0	0	0	0	3	3	0	6	5	2	5	1	0
Instruments & Apparatus	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Mathematical Physics	13	0	0	0	0	0	3	1	1	4	0	3	1	0	0
Periodicals, Societies, Congresses	43	1	0	0	0	1	6	3	5	19	2	3	0	0	3
Philosophy & Methods	5	0	0	0	0	1	1	0	0	1	2	0	0	0	0
Physics, General	14	0	0	0	0	1	0	0	0	10	1	1	0	1	0
Study & Teaching	6	0	0	0	0	0	0	0	0	3	1	2	0	0	0

By Material Type

Subject	Totals	Books	Journals/Magazines
Acoustics, Sound Totals	3	0	3
Acoustics, Sound - General Works	2	0	2
Sound Waves	1	0	1

Subject	Totals	Books	Journals/Magazines
Analytical Mechanics Totals	11	3	8
Analytical Mechanics	9	3	6
Dynamics. Kinematics	2	0	2

Subject	Totals	Books	Games (All)	Journals/Magazines	Videos
Astronomy Totals	153	115	1	31	6
Astronomical Instruments, Photography, Photometry	10	9	0	1	0
Astronomy	6	5	0	1	0
Astronomy, General - Star Catalogs, Observations	21	6	0	15	0
Astrophysics - Nuclear, Plasma, etc.	7	2	0	5	0
Comets, Meteors, Meteorites	3	2	0	0	1
Cosmogony & Cosmology	19	17	0	0	2
Descriptive Astronomy, General. Space Sciences	5	5	0	0	0
Extraterrestrial Life	6	5	0	0	1
Galaxies, Quasars	1	1	0	0	0
Geodesy, General	2	0	0	2	0
History, Biography	14	14	0	0	0
Planetary Studies	16	14	0	0	2
Popular & Juvenile Works, Elementary Textbooks	12	10	0	2	0
Practical & Spherical Astronomy	9	8	1	0	0
Solar Studies	7	4	0	3	0
Stellar Studies	3	3	0	0	0
Study & Teaching, Observatories & Planetariums	10	9	0	1	0
Types of Stars, incl. Black Holes, Neutron Stars	2	1	0	1	0

Subject	Totals	Books	Computer Files	Journals/Magazines	Videos
Constitution & Properties of Matter Totals	48	23	1	22	2
Atomic Physics, Constitutions & Properties	14	1	1	11	1

Gravitation	2	2	0	0	0
Quantum Theory. Field Theories	9	9	0	0	0
Relativity	12	9	0	2	1
Special Properties of Matter	2	0	0	2	0
Statistical Physics	5	2	0	3	0
Surfaces, Thin Films, Solid State Physics	4	0	0	4	0

Subject	Totals	Books	Journals/Magazines	Videos
Electricity, Magnetism, Nuclear Physics Totals	53	25	27	1
Electric Current. Electrodynamics	2	2	0	0
Electric Waves	3	1	2	0
Electricity, General	5	5	0	0
Electrostatics	2	0	2	0
Magnets & Magnetism	12	4	8	0
Nuclear Physics	22	13	8	1
Plasma Physics	5	0	5	0
Superconductivity	2	0	2	0

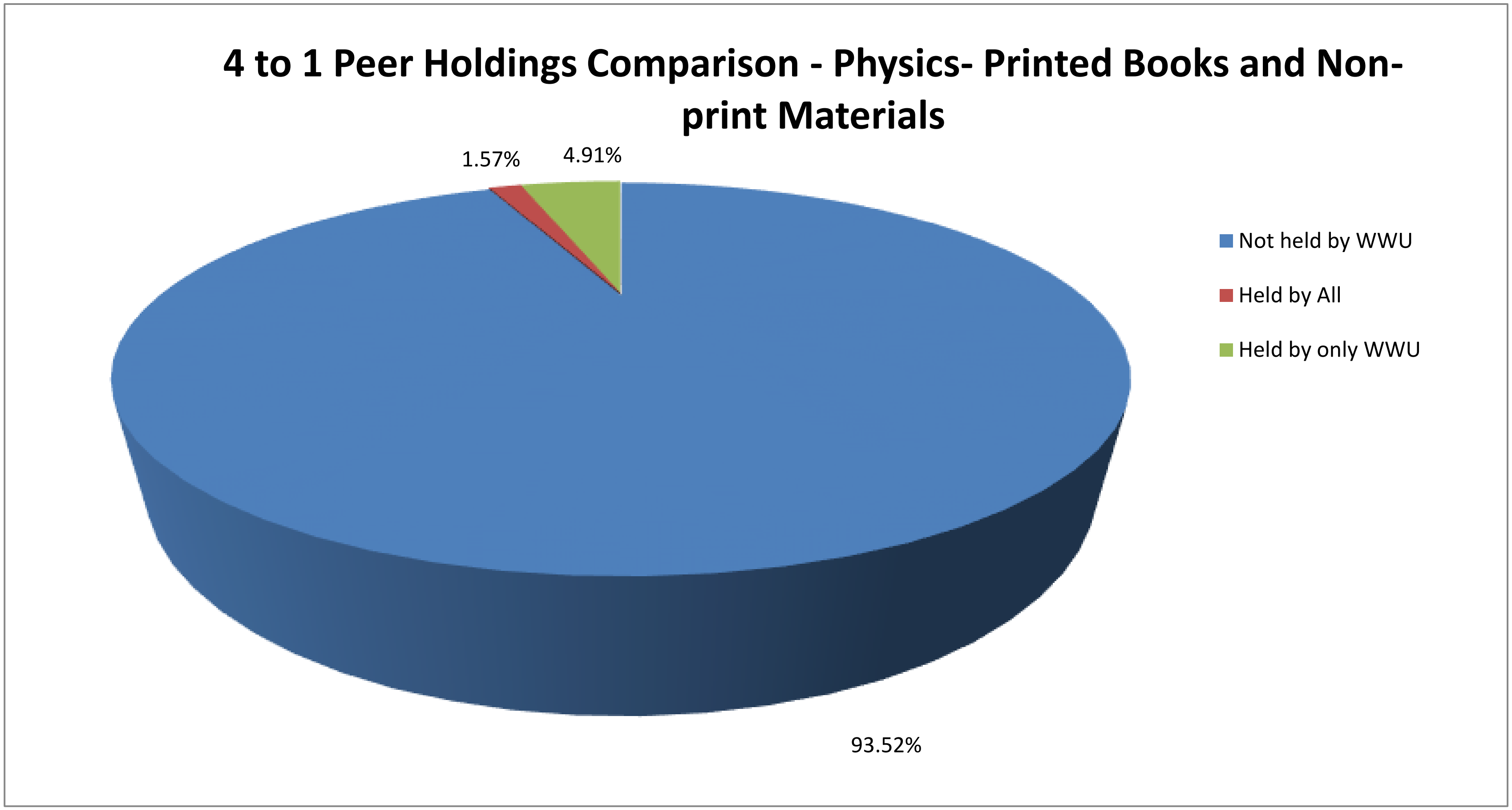
Subject	Totals	Books	Journals/Magazines
Heat Totals	18	9	9
Heat	1	0	1
Heat - General Works	3	3	0
Heat Transfer	2	0	2
High Temperature Physics	1	0	1
Low Temperature Physics	1	0	1
Thermodynamics	9	5	4
Thermometers & Thermometry	1	1	0

Subject	Totals	Books	Journals/Magazines
Optics, Light, Radiation Totals	22	10	12
Geometrical Optics	3	3	0
Holography	1	0	1
Optics - General Works	10	4	6
Physical Optics	1	0	1
Quantum Optics	1	0	1
Radiation Physics - Luminescence, X-rays, Color	3	3	0
Spectroscopy, Theoretical - General	3	0	3

Subject	Totals	Books	Journals/Magazines	Videos
Physics, General Totals	109	49	59	1
Dictionaries & Encyclopedias	2	2	0	0
History, Biography, Early Works	25	25	0	0
Instruments & Apparatus	1	0	1	0
Mathematical Physics	13	3	10	0
Periodicals, Societies, Congresses	43	0	43	0
Philosophy & Methods	5	5	0	0
Physics, General	14	12	2	0
Study & Teaching	6	2	3	1

III. Comparison with Peer Institutions (4 to 1 comparison)

Libraries Used for Comparison: Stephens College, Columbia College, Westminster College, Central Methodist University



IV. Analysis

Physics as a discipline taught at the undergraduate level requires primarily up-to-date materials. A continued effort is made to acquire materials in both electronic and printed formats. This is not a strong collection as physics was not taught at WWU until the 1990's. In addition, not many monographs are published in this discipline. All books, journal articles and non-print materials are available through *Woods OneSearch.* The Library subscribes to a comprehensive database, *Academic Search Complete,* which is available to all students, both traditional and online.

The library staff acquires any resources that are not available in existing print and digital collections through interlibrary loan.

As in all other disciplines, WWU faculty and students have access to the resources available in MOBIUS member libraries, which includes the superb collections at the large research institutions in the state of Missouri, i.e., the four campuses of the University of Missouri, Washington University, Missouri State University and St. Louis University. Beginning in 2014, access to the resources of the academic, public and special libraries in Colorado and Wyoming became possible through Prospector, a resources sharing partner of MOBIUS. Prospector provides access to an additional 30 million books, journals, DVDs, CDs, videos and other materials, and includes the collections of the libraries at the campuses of the University of Colorado, Colorado State University, University of Denver, and the University of Wyoming. Resources selected from both MOBIUS and Prospector are delivered by courier, thereby reducing the delivery time.

Annual Assessment Report

Physics Minor

Dr. Vern Hart

2015-2016

Annual Assessment Report

Program Profile

	2014-2015	2015-2016
Minors	3	10
Full Time Faculty	3	3
Part Time Faculty	0	0

Combine all major students. If your discipline has a **secondary education certification component**, you will need to indicate that in the title of this report unless you are submitting a separate report for the education component.

*If your discipline is a major with **one or multiple concentrations**, that information needs to be included as separate content. Report the number of declared students by concentration and each concentration will need a separate assessment section.

Program Delivery (HLC 3A3)

Traditional on-campus ____X_____

Online Program ____________

Evening Cohort _____________

Analysis:

The physics minor program has the following retention goals for the upcoming academic year:

1. At least 85% of students who enroll in an upper-division physics course will declare a physics minor.
2. At least 90% of students who declare the minor will finish the program prior to graduation.
3. At least 6 students who complete the introductory physics sequence will enroll in an upper-division physics course each year.

It is also anticipated that this program will not increase the time to degree for students in other major programs. Students who declare a physics minor will be expected to graduate within the standard four-year period which is planned for most students. Any physics minors requiring additional time will be evaluated on an individual basis to determine whether the program contributed to the need for additional semesters of study. If this is found to be the case, further assessment will be conducted. To date, this program has not caused any delays in student graduation schedules.

Outside Accreditation:

There are currently no plans for outside accreditation for this program as it is a minor program and is currently in its second year of availability. Once the program has completed multiple academic cycles, this option may be explored further.

Program Action Items

Action Item 1:	Consistently achieve an enrollment of at least 5 students in Modern Physics (PHY 315) each year. The course is offered annually during the fall semester.
Action steps:	The course will be advertised in the introductory physics sequence in order to inform students of content covered in the course.
Timeline	The 2014-2015 and 2015-2016 school years (2 course cycles).
Faculty Responsible	Dr. Vern Hart
Evaluation	During the fall of 2014, 6 students enrolled in the PHY 315 course. During the fall of 2015, 7 students enrolled in the PHY 315 course. The benchmark for this action item has been met successfully.

Action Item 2:	Produce at least 4 physics minors per year. This will help to ensure that the program remains a viable option for students who are interested in physics and create potential for future program growth.
Action steps:	Students will be informed of the possibility for receiving a physics minor. They will also be invited to participate in the physics honor society (physics demo team).

Timeline	The 2014-2015 and 2015-2016 school years (2 graduation cycles).
Faculty Responsible	Dr. Vern Hart
Evaluation	During the 2014-2015 school year, 8 students declared a physics minor (6 in the fall and 2 during a special tutorial taught in the spring). During the 2015-2016 school year, 7 students declared a physics minor. The benchmark for this action item has been met successfully.

Program Objectives: (from most recent Assessment Plan)

1. Students will develop a functional understanding of the fundamental physical laws governing the universe, along with their mathematical representations.

2. Students will obtain familiarity with the scientific method and the processes involved in conducting sound experimentation and data collection.

3. Students will improve their numerical skills and learn to discern physically meaningful data and correlations from statistically insignificant data.

4. Students will acquire an appreciation for the technological and other developments resulting from physical theories and discoveries.

Program Objectives Matrix (from most recent Assessment Plan)

	Objective 1	Objective 2	Objective 3	Objective 4
PHY 201	I,A	I,A		
PHY 202		I,A	I	
PHY 212	R,A		R,A	
PHY 213		R	R,A	
PHY 315	M			I,A
MAT 124	R			
CHM 114/115 MAT 214	R			

All objectives must be assessed either yearly or as articulated on a cycle. Objectives are not necessarily assessed each time they are listed as a Program objective for the course. The faculty in the program determine when the objective will be assessed, in which course, with which artifact, and what if any outside assessment will occur.

Assessment of Program Objectives

Objective 1	Students will develop a functional understanding of the fundamental physical laws governing the universe, along with their mathematical representations.
Methods	Mastering Physics homework assignments in PHY 201 Final exam essay and derivation questions in PHY 201
Benchmark	At least 85% of students will achieve an overall homework score of >85% A class average of 80% on the final exam
Data Collected (course specific)	Overall homework and final exam scores were collected from 28 students in the PHY 201 course and averaged. The mean homework score was 90.2% and the mean final exam score was 80.1% (see Figure 1).
Data Collected (Assessment Day)	Minor programs do not currently participate in assessment day.
Results/Outcomes	The homework benchmark was successfully achieved. The final exam benchmark was successfully achieved.
Proposed changes to the assessment process	The average homework score was ~5% higher than during the last course rotation. The instructor implemented a new textbook which included more examples than the previous edition, which may have partially accounted for the increase. The benchmark seems appropriate but if it is consistently achieved over multiple cycles it may need to be raised to reflect the standards of the course.
Budget needs related to the objective?	None

Objective 2	Students will obtain familiarity with the scientific method and the processes involved in conducting sound experimentation and data collection.
Methods	Lab reports assigned weekly during PHY 202 Short-answer questions on course exams in PHY 201
Benchmark	A minimum class average of 90% on all PHY 202 lab reports A class average of 80% on all PHY 201 short-answer exam questions
Data Collected (course specific)	Lab report scores were collected from all 28 students enrolled in the PHY 202 course. The average lab report score was 100%, due to a recent course policy change (see below). Short answer exam questions were collected randomly for 10 students enrolled in PHY 201. The average score was 4.3/5 (86%).
Data Collected (Assessment Day)	Minor programs do not currently participate in assessment day.
Results/Outcomes	The benchmark was successfully reached in each case.
Proposed changes to the assessment process	The current benchmark for lab report grades is too low and needs to be raised to reflect the standards of the course. During this course rotation, a new policy was implemented in which lab grades were given for completion and experimental accuracy, as opposed to lab report verbiage. The next assessment plan will focus on lab attendance, completion, and accuracy of results. It is proposed that 90% of students will have perfect lab attendance with full completion of each lab assignment.
Budget needs related to the objective?	None

Objective3	Students will improve their numerical skills and learn to discern physically meaningful data and correlations from statistically insignificant data.
Methods	Lab reports assigned weekly during PHY 213 Homework essay questions in PHY 212
Benchmark	A minimum class average of 90% on all PHY 213 lab reports At least 85% of students will achieve an overall homework score of >85%
Data Collected (course specific)	Lab report and homework scores were collected from all 28 students enrolled in the PHY 212/213 course. The average lab report score was 98%. The average homework score was 87% (see Figure 2). However, only 17 of 28 (61%) of students scored at least an 85% average across all homework assignments.
Data Collected (Assessment Day)	Minor programs do not currently participate in assessment day.
Results/Outcomes	The lab benchmark was successfully achieved, however, the homework benchmark was deficient.
Proposed changes to the assessment process	The lab report benchmark is too low as students typically attend every lab period during the semester. In future reports, a different (non-attendance-based) metric will need to be used to assess the lab's effectiveness. The homework average was satisfactory, however, the total number of students achieving this average fell below the benchmark. It is recommended that the benchmark either be modified to only consider the overall average, or reconsider the number of students achieving the average. Expecting 85% of students to achieve a B+ average on an assignment may be unreasonable given the overall average grade in the course. This benchmark (average) could also be modified to be more representative of a typical course distribution.
Budget needs related to the objective?	None

Objective 4	Students will acquire an appreciation for the technological and other developments resulting from physical theories and discoveries.
Methods	Homework assignments in PHY 315 Final exam essay questions in PHY 315
Benchmark	A minimum class average of 90% on all PHY 315 homework assignments An average score of 82% on PHY 315 final exam essay questions
Data Collected (course specific)	Homework and final exam scores were collected for all 7 students enrolled in the PHY 315 course. The average homework score was 87.1% and the average final exam score was 84.9% (see Figure 3).
Data Collected (Assessment Day)	Minor programs do not currently participate in assessment day.
Results/Outcomes	The homework benchmark was ~3% deficient. The final exam benchmark was achieved successfully.
Proposed changes to the assessment process	The current benchmark for PHY 315 seems appropriate. On further investigation, a few low homework scores decreased the overall average. In future assessment cycles, this benchmark may be rewritten to state that a certain percentage of students (90%) are required to meet the benchmark. This condition has been used to assess other objectives within this program.
Budget needs related to the objective?	None

Analysis of Assessment:

The benchmarks for lab reports are too low and need to be revised in the next assessment cycles to reflect the new grading policy change. Students often work together (as a lab group) in completing their lab reports, resulting in high grades. These scores may not be adequately suited for assessment purposes and alternative benchmarks may need to be identified.

Analysis of the Assessment Process (Empirical & Non-Empirical) (HLC4B3)

Coursework data were collected using Owlnet. Scores were exported to an excel spreadsheet and averages were calculated for specific course categories (i.e. homework, labs, exams, etc.) This process worked well for PHY 201 and PHY 212 but did not work well for PHY 202 and PHY 213 as mentioned above.

Program Changes Based on Assessment:

The majority of benchmarks were reached in each case with most students receiving raw homework and exams scores near 80% (B). Student success in upper-division courses is well-correlated with success in their lower-division courses. This indicates that students are learning the required material and successfully meeting the objectives of the program.

General Education Assessment:

PHY 201, 202, 212, and 213 satisfy general education requirements for the Natural Sciences. General Education objectives are included in the assessment of individual courses.

Program Activities:

Student Performance Day Activities (Assessment Day):

Minor programs do not currently participate in assessment day.

Senior Achievement Day Presentations:

Minor programs do not currently participate in senior achievement day.

Service Learning Activities:

Several members of the PHY 315 course participated in the science demo team during the fall semester. This organization travels to local elementary schools and conducts science shows for grade school students. The students benefit from learning to present and explain the scientific principles included with each demonstration. The community also benefits from attendance at these events.

Program Sponsored LEAD Events:

During the fall semester, a poster session LEAD event was sponsored to facilitate student presentations on the history of scientific discovery. This event allowed students to organize and present information to a group of their peers, in line with general education objectives. It is also congruent with program objective 4 (developing an appreciation of technologies stemming from scientific discoveries).

Student Accomplishments:

-One student enrolled in PHY 315 (biology major) secured a summer internship during the fall semester.

-Three students successfully applied for post-graduate school.

-In the spring of 2016, two students presented at the annual meeting of the Missouri Academy of Science.

-Two students completed the MCAT exam during the summer.

Faculty Accomplishments:

- Presented research on deformable image registration at the 2015 APS fall meeting.
- Presented results of image segmentation research at the 2015 MAS meeting.
- Chaired History faculty search committee.
- Elected to serve on the curriculum committee.
- Asked to review an article for the journal "Advances in Space Research."
- Submitted an article to the "Journal of Atmospheric Solar and Terrestrial Physics."
- Hosted "Science Night" at Bartley Elementary School.
-Presented research on auto-segmentation at the 2016 MAS meeting.

Alumni (Recent Graduates) Accomplishments (past year graduating class):

One student who completed the physics minor during the past school year accompanied me to the annual meeting of the American Physical Society (APS) at the University of Notre Dame in South Bend, Indiana. The student presented the results of their medical imaging research. This same student also presented research at the 2016 annual meeting of the Missouri Academy of Science.

PHY 201						
Student Name			Laboratory	Final Exam	Homework	Tests
ID	Last Name	First Name	%	%	%	%
248498	Bailey	Alexis	100	96	99.52	90
246689	Buff	Lainie	100	84	96.87	73.5
239531	Burns	Alex	100	78	69.96	76.5
258395	Cappaert	Elyssa	100	87	102.74	89
222835	Delcamp	Trey	100	82	97.55	83.5
230159	Doran	Jessica	100	80	84.05	85.5
217474	Dru	Alex	100	70	71.7	72.5
240079	Dunn	Cassie	100	84	96.33	94.5
217392	Frabotta	Rachel	100	91	100.38	96.5
232551	Henry	Billie	100	90	90.19	83
251893	Hish	Sara	100	74	77.52	58.5
238870	Honigman	Victoria	100	74	92.58	77
243839	Koelling	Mckenzie	100	80	97.71	90
243840	Kroll	Liz	100	86	88.95	86
252653	Lane	Karinne	100	87	96.07	85
249180	McElwee	Kristy	100	78	98.94	88.5
249973	McMahill	Madelyn	100	76	98.81	72
284089	O'Connor	TJ	100	83	100.1	83.5
234283	Pivonka	Kayleigh	100	72	84.96	78
268038	Rutherford	Hannah	100	81	101.83	88
233377	Strosnider	Jennifer	100	79	94.93	84.5
243032	Turner	Katie	100	81	102.73	87.5
232608	Van Ausdal	Sara	100	84	103.8	95.5
255933	White	Ashley	100	79	94.66	90
302608	Witkowski	Douglas	100	76	43.89	68
247599	Wolfe	Preston	100	83	92.77	84
214166	WomanDress	Victoria	100	54	86.49	63.5
232750	Yelton	Lauren	100	75	58.96	70
			AVERAGE	**AVERAGE**	**AVERAGE**	**AVERAGE**
			100	**80.14285714**	**90.17821429**	**81.92857143**

Figure 1: Specific overall category scores for students in PHY 201 (fall 2015). These data were used to assess objectives 1 and 2.

Student Info					PHY 212							
Name			*Final Grade*		Final Exam		Homework		Labs		Tests	
ID	Last Name	First Name	%	Letter	%	Let	%	Let	%	Let	%	Let
248498	Bailey	Alexis	92.22	A	91	A	83.08	B	100	A	93.5	A
246689	Buff	Lainie	82.49	B	98	A	68.46	D	100	A	73	C
239531	Burns	Alex	80.31	B	87	B	61.54	D	100	A	76.5	C
258395	Cappaert	Elyssa	98.2	A	100	A	100	A	100	A	95.5	A
222835	Delcamp	Trey	91.73	A	*0*	*F*	100	A	90.91	A	88	B
230159	Doran	Jessica	81.09	B	87	B	71.54	C	90.91	A	78	C
217474	Dru	Alex	80.14	B	70	C	82.69	B	100	A	74	C
240079	Dunn	Cassie	93.42	A	96	A	98.08	A	100	A	86.5	B
217392	Frabotta	Rachel	91.98	A	100	A	80	B	90.91	A	94.5	A
232551	Henry	Billie	83.91	B	82	B	76.54	C	100	A	80.5	B
251893	Hish	Sara	73.35	C	70	C	68.85	D	90.91	A	68.5	D
243839	Koelling	Mckenzie	93.65	A	81	B	99.23	A	100	A	94	A
243840	Kroll	Liz	91.97	A	83	B	93.85	A	100	A	91.5	A
252653	Lane	Karinne	85.95	B	79	C	90.77	A	100	A	80	B
249180	McElwee	Kristy	93.02	A	90	A	98.08	A	100	A	88.5	B
284089	O'Connor	TJ	90.43	A	86	B	96.15	A	100	A	85	B
230358	Peters	Hallie	84.31	B	81	B	71.54	C	100	A	84.5	B
234283	Pivonka	Kayleigh	81.18	B	85	B	71.92	C	100	A	74.5	C
268038	Rutherford	Hannah	94.23	A	93	A	96.15	A	100	A	91	A
235840	Schmidt	Ryan	91.49	A	83	B	98.46	A	100	A	88	B
232511	Schulte	Brailee	94.17	A	92	A	98.85	A	100	A	90	A
233377	Strosnider	Jennifer	93.14	A	87	B	97.69	A	100	A	90.5	A
243032	Turner	Katie	94.26	A	93	A	97.31	A	100	A	90.5	A
232608	Van Ausdal	Sara	93.97	A	96	A	98.85	A	100	A	87.5	B
255933	White	Ashley	92.12	A	83	B	99.62	A	100	A	89	B
252691	Whitley	Mary	82.87	B	79	C	83.46	B	90.91	A	80.5	B
247599	Wolfe	Preston	85.89	B	84	B	88.46	B	100	A	78.5	C
214166	WomanDress	Victoria	76.82	C	78	C	78.08	C	100	A	64	D
			Average		**Average**		**Average**		**Average**		**Average**	
			88.15392857		**83.357143**		**87.47321429**		**98.3767857**		**84.14286**	

Figure 2: Specific overall category scores for students in PHY 212 (spring 2016). These data were used to assess objective 3.

PHY 315				
Student Name			Homework	Exams
ID	Last Name	First Name	%	%
232689	Briles	Ashley	90.83	75
200603	Brumit	Matt	33.33	70.5
217107	Dolan	Jodie	95.83	90
234441	McNamara	Jordan	99.17	96.5
230358	Peters	Hallie	97.5	83.5
231973	Riebkes	Hannah	94.17	84
217212	Ryan	Joanie	99.17	94.5
			Average	**Average**
			87.14285714	84.85714286

Figure 3: Specific overall category scores for students in PHY 315 (fall 2015). These data were used to assess objective 4.

Physics Annual Assessment 2016-2017

Annual Assessment

Physics

Program Profile

Program Mission Statement

Please insert your program mission statement here

The primary objective of the physics program is to help students learn to develop and accurately apply mathematical and analytical processes to descriptions and models of systems in the natural world. This is done through hands-on lab work, original research, and traditional coursework. The skills acquired in this program will prepare students to pursue a wide range of technical careers as well as further education.

Program Data

Delivery Method

Traditional On Campus (selected)
Online
Hybrid

Students Majors 2015-2016

Student Minors 2015-2016

7

Student Majors 2016-2017

2

Student Minors 2016-2017

21

Concentrations 2015-2016

If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

N/A

Concentrations 2016-2017

If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

N/A

Student Demographics

Program goals for student retention, persistence and degree completion are? What do the persistence numbers mean to the faculty in the program? Are your persistence numbers what you expected? If not, how could the numbers be improved? What is the optimal enrollment for the program?

The program has the following goals for retention and growth during the 2016-2017 school year:

-Retain all current physics majors and recruit one additional physics major

-Retain at least 90% of the current physics minors and recruit two additional physics minors

These goals will help to ensure that the programs remain viable going forward. Both degrees have been monotonically increasing in enrollment since their introduction. While this growth is expected to remain relatively slow, the goal is to maintain a steady increase. Both programs could grow significantly before reaching optimal enrollment.

Is the Program Externally Accredited

Yes
No (selected)

External Accreditation
Name the Accrediting Agency or entity including the last review/approval. Is there an accrediting body for the field of study? If yes, what is the name of the group. Is the program seeking accreditation?If no, why?

There are currently no accrediting agencies for a program of this type.

Program Assessment

Standard/Outcome

Identifier	Description
HLC-CRITERIA-2013.4	Criterion Four. Teaching and Learning: Evaluation and Improvement: The institution demonstrates responsibility for the quality of its educational programs, learning environments, and support services, and it evaluates their effectiveness for student learning through processes designed to promote continuous improvement.
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.
WWU2016.2	Ethics: Students will exhibit values and behaviors that address self- respect and respect for others that will enable success and participation in the larger society.
WWU2016.3	Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.
WWU2016.4	Lifelong Education: Students will possess an intellectual curiosity and desire for continual learning both within and beyond formal education in preparation for participation in a global society.

Additional Standards/Outcomes

Identifier	Description
PHY.1	Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.
PHY.2	Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.
PHY.3	Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.

PHY.4	Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

General Education Alignment to Program

How do the General Education criteria align with the Program Objectives? What courses within your program build upon skills learned in general education courses (please list the program course and the general education criteria). The General Education clusters are: Critical Analysis, Creative Expression, Quantitative Inquiry, and Society & the Individual. See attached for more detailed breakdown.

This program compliments several objectives from the general education program, mostly in the 'Quantitative Inquiry' cluster. In PHY 202 - Physics II, students develop and practice quantitative problem-solving skills when completing course homework assignments. In PHY 213 - Physics II Lab, students analyze and evaluate information in a larger context when completing laboratory assignments. Students are given lab manuals and are expected to read instructions, perform preliminary calculations, and apply concepts from the lecture in order to conduct their experiment. These skills are consistent with the GE description for the natural sciences.

The program also builds on skills developed in the 'Critical Analysis' cluster. Students are expected to apply logical and analytical reasoning skills to diverse source material when they conduct literature reviews in PHY 490 - Senior Research. This course often involves case studies and independent investigation in which students must use recent literature to guide their research direction. Students are often expected to read original articles and determine objectives for future research. These skills build upon and are consistent with the description given for critical thinking.

GE_Cluster_Descriptions_FINAL_Version_Approved.docx

Curriculum Map

A - Assessed
I - Introduced
R - Reinforced
M - Master

Physics

	PHY 201	**PHY 202**	**PHY 212**	**PHY 213**	**PHY 315**	**PHY 318**	**PHY 321**	**PHY 360**	**PHY 381**	**PHY 382**	**PHY 421**
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.	I, A	I, A	R	R	M, A		R				R
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.		I		A, I		R			R	R	
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.	I		I				A, R				M

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.					I			R			

	PHY 422	**PHY 450**	**PHY 460**	**PHY 480**	**PHY 490**	**MAT 124**	**MAT 214**	**MAT 215**	**MAT 224**	**MAT 312**
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.	R			M						
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.		M, A		M, A						
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.	M					R	R	R	R	R
PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.			R		M, A					

Assessment Findings

Assessment Findings for the Assessment Measure level for Physics

PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.

Assessment Measures

PHY 201				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion A minimum of 85% of students will achieve an overall homework score of >85% been met yet? Met	22/25 (88%) of students in this course received an overall HW grade higher than 85%. This is 3% higher than the stated goal. As such, the benchmark, which seems to be appropriate for this course, has been met successfully.	HW_Phy1.PNG	

PHY 202				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion At least 90% of students will complete all lab reports. been met yet? Met	24/25 students (96%) completed all lab reports. The objective has been met.	PHY_212_Lab.PNG	

PHY 315				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 85% on in-class quizzes. been met yet? Met	The average quiz score in this course was an 89.17%, which is approximately 4% higher than the stated goal. As such, the benchmark, which seems appropriate for this course, has been met.	Modern_Quizzes.PNG	

PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.

Assessment Measures

PHY 213				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion At least 90% of students will complete all lab reports. been met yet? Met	96% of students (24/25) completed all lab reports. As such, the objective has been met.	PHY_212_Lab.PNG	

PHY 450				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 85% on student-designed experiments. been met yet? Not met	This course was not offered during the 2016-2017 school year.		

PHY 480				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 80% on course programming assignments. been met yet? Met	The average score on all programming assignments in the course was 93.1%. As such, the criterion was met successfully. This benchmark is too low and needs to be adjusted in future cycles.	Numerical_Assignments.PNG	

PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.

Assessment Measures

PHY 321				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 80% on in-class exams. been met yet? Met	The average exam score for this course was an 83.5%. This is 3.5% higher than the stated goal. As such, the criterion has been met successfully. This benchmark will be reevaluated in the next assessment cycle to determine if it needs to be raised.	Mechanics_Tests.PNG	

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

Assessment Measures

PHY 490				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion All students will successfully compose a senior thesis. been met yet? Not met	The senior research practicum course was not offered during the 2016-2017 school year as no seniors were enrolled in the program at the time.		

Analysis of the Assessment Process

Describe your assessment process; clearly articulate how the program is using course work and or assessment day activities for program assessment. Note any changes that occurred to that process since the previous year. Discuss what activities were successful at assessment and which ones were not as helpful and why. Please include who met to discuss the changes (unless you are a program of one person) and when you met. – Include a discussion on the process for collection and analysis of program data.

Data will be collected from owlnet during the 2016-2017 school year.

Improvement Narrative List

Assessment Findings for the Assessment Measure level
No improvement narratives have been added.

Program Activities

Student Performance Review
Describe the department assessment day activities if not already described previously. Please articulate the nature of the assessments are conducted, explain the process for assessment that happens on these two days. Include the schedule of assessment day for your program. What does the data and outcomes tell you? What changes will you make as a result of the data? What areas are successful for the program?

Assessment activities will be developed prior to achievement days. Options for field tests are currently being explored in addition to oral exams and/or presentations. Interviews will likely also be incoproated into the process.

Student Performance Review Schedule
Upload the program schedule for students during Performance Reviews.

Senior Showcase
Describe program Senior Showcase activities if not detailed previously in the report? What benefit does the program gain from the activities? What if any assessment of students happens during this event? What changes if any will occur due to what is learned by faculty on Senior Showcase?

No seniors are currently majoring in the program.

Assessment Rubrics
Upload rubrics used for Senior Showcase or Student Performance Reviews for student assessment.

Service Learning
Does the Program include projects/ course content that uses the philosophy of service learning?
Yes
No (selected)

Service Learning Component
If so, how is service learning infused in the coursework within your department? Is service or community engagement in the program mission? Describe the Service Learning Activities that your students and department engaged in this past year. How did the activities improve student learning? How did the activities benefit the community?

Several students enrolled in the program participate in the science demo team, an outreach organization that travels to local elementary schools and conducts science shows for students and the community.

LEAD Events
Highlight lead events sponsored by program faculty that are connected to program or general education objectives for the past academic year. Include a total number of lead events program faculty sponsored.

Three physics minors participated in STEM night at Bartley Elementary School. This was an outreach activity in which students conducted a science show and hosted demo booths which were open to the public.

Student Accomplishments

Highlight special examples of student successes in the field (academic: mentor-mentee, conference presentations, competitive internship, journal acceptance; extra-curricular: horse show championship, art exhibit). This is for any accomplishments that a student achieved outside of course work or the normal expectations of student success.

One of the program majors was a co-author on an oral presentation entitled: "Diffusive optical investigations of micro-cancer using NIR light," presented at the 2017 annual meeting of the Missouri Academy of Science in St. Charles, MO.

Annual Assessment Rubric

8.000 pts 66.67%

	3.000 Assessment Reflects Best Practices	2.000 Assessment Meets the Expectations of the University	1.000 Assessment Needs Development	0.000 Assessment is Inadequate	N/A
Learning Objectives weight: 1.000	• Detailed, measurable program learning objectives • Objectives are shared with students and faculty	• Measurable program learning objectives. • Learning objectives are available to students.	• Program learning objectives are identified and are generally measurable	• Program learning objectives are not clear or measurable	N/A
Comment:					
Assessment Measures weight: 1.000	• Multiple measures are used to assess a student-learning objectives. • Rubrics or guides are used for the measures. • All measurements are clearly described. • External evaluation of student learning included.	• Assessment measures relate to program learning objectives. • Various measures are used to assess student learning. • Measures chosen provide useful information about student learning.	• Assessment focuses on class content only. • Minimal description of how the assessment relates to the objective. • Minimal assessment measures established.	• Assessment measures not connected to objectives. • Assessment measures are not clear. • No assessment measures are established.	N/A
Comment:					
Assessment Results weight: 1.000	• All objectives are assessed annually, or a rotation schedule is provided. • Data are collected and analyzed to show learning over time. • Standards for performance and gaps in student learning are clearly identified.	• Most objectives assessed annually. • Data collected and analyzed showing an annual snapshot of student learning. • Data are used to highlight gaps in student learning. • Some data from non-course based content.	• Data collected for at least one program objective. • Data collection is incomplete. • Gaps in student learning not identified. • Lacking external data to support course data.	• Learning objectives are not routinely assessed. • Routine data is not collected. • No discussion on gaps in student learning. • No use of external data to support student learning. • Assessment data not yet collected.	N/A
Comment:					
Faculty Analysis and Conclusions weight: 1.000	• Data is shared that incorporates multiple faculty from the program. • Discussions on data results incorporate multiple faculty. • Opportunities for adjunct faculty to participate. • Includes input from external sources when possible.	• Multiple program faculty receive assessment results. • Assessment results are discussed • Specific conclusions about student learning are made based on the available assessment results.	• Minimal faculty input about results is sought • Data not used to determine success or not to the objective. • Minimal conclusions made.	• Faculty input is not sought. • Conclusions about student learning are not identified. • N/A Program recently started or too few graduates to suggest any changes.	N/A
Comment:					
Actions to Improve Learning and Assessment weight: 1.000	• All assessment methods, timetable for assessing, and evaluating the effectiveness modifications are included. • Changes to assessment are inclusive of multiple faculty. • Description of changes is detailed and and linked to assessment results.	• More than one change to assessment is proposed, timetable for assessment, and evaluating the change is provided. • Changes to assessment measures is highlighted. • Changes are realistic, with a good probability of improving learning or assessment.	• At least one change to improve learning or assessment is identified. • The proposed action(s) relates to faculty conclusions about areas for improvement. • Adjustments to the assessment are proposed but not clearly connected to data	• Lacking actions to improve student learning. • Actions discussed lack supportive data. • Lacking discussion of the effectiveness of the assessment plan	N/A
Comment:					

WILLIAM WOODS
UNIVERSITY

Physics Annual Assessment 2019-2020

Annual Assessment 2019-2020

Physics

Program Profile

Program Mission Statement
Please insert your program mission statement here

The primary objective of the physics program is to help students learn to develop and accurately apply mathematical and analytical processes to descriptions and models of systems in the natural world. This is done through hands-on lab work, original research, and traditional coursework. The skills acquired in this program will prepare students to pursue a wide range of technical careers as well as further education.

Program Data

Delivery Method

Traditional On Campus (selected)
Online
Hybrid

Student Majors 2018-19

3

Students Majors 2019-2020

3

Student Minors 2018-19

4

Student Minors 2019-20

3

Concentrations 2018-19
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

N/A

Concentrations 2019-20
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

N/A

Student Demographics
What are the program goals for student retention, persistence and degree completion? What do the persistence numbers mean to the faculty in the program? Are your persistence numbers what you expected? If not, how could the numbers be improved? What is the optimal enrollment for the program?

The program has the following goals for retention and growth during the 2018-2019 school year:

-Retain all current physics majors and recruit one additional physics major

-Retain at least 90% of the current physics minors and recruit two additional physics minors

These goals will help to ensure that the programs remain viable going forward. Both degrees have been monotonically increasing in enrollment since their introduction. While this growth is expected to remain relatively slow, the goal is to maintain a steady increase. Both programs could grow significantly before reaching optimal enrollment.

Is the Program Externally Accredited

Yes
No (selected)

External Accreditation
Name the Accrediting Agency or entity including the last review/approval. Is there an accrediting body for the field of study? If yes, what is the name of the group. Is the program seeking accreditation?If no, why?

There are currently no accrediting agencies for a program of this type.

Marketing Materials
Please reflect on the current marketing materials used for the program. Detail what documents you are reviewing and attach a screenshot of any webpages or materials that you cannot include as a document. What changes, if any should be made to the material? Are there recommendations for how or where to market the program?

Marketing Material

Program Assessment

Standard/Outcome

Identifier	Description
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.
WWU2016.2	Ethics: Students will exhibit values and behaviors that address self- respect and respect for others that will enable success and participation in the larger society.
WWU2016.3	Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.
WWU2016.4	Lifelong Education: Students will possess an intellectual curiosity and desire for continual learning both within and beyond formal education in preparation for participation in a global society.

Additional Standards/Outcomes

Identifier	Description
PHY.1	Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.
PHY.2	Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.
PHY.3	Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.

PHY.4	Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

Alignment to the University Objectives

Please discuss the program alignment to the University Objectives. We do not need an artifact for each objective, but a discussion on how the program uses the Institutional Objectives as an anchor for their program curriculum.

Physics teaches more than just how the universe operates at a basic level. It teaches problem solving. It teaches students how to think for themselves and arrive at evidence based conclusions. Physics students are taught that no problem is too complicated. Provided with a problem, they are trained to take it apart, determine the important parameters, explore possible outcomes and discover new, elegant ways to reach a solution. In doing so, thier confidence and ability improve so that they can enter the world equipped with the tools they need to help tackle the problems of our society through logical, quantitative analysis.

General Education Alignment to Program

How do the General Education criteria align with the Program Objectives? What courses within your program build upon skills learned in general education courses (please list the program course and the general education criteria). The General Education clusters are: Critical Analysis, Creative Expression, Quantitative Inquiry, and Society & the Individual. See attached for more detailed breakdown.

Critical Analysis:

Students are expected to apply logical and analytical reasoning skills to diverse source material when they conduct literature reviews in PHY 490 - Senior Research. This course often involves case studies and independent investigation in which students must use recent literature to guide their research direction. Students are often expected to read original articles and determine objectives for future research. These skills build upon and are consistent with the description given for critical thinking.

Creative Expression:

Throughout the physics program, students are required to express physics concepts both visually through detailed graphs and figures in lab reports (PHY 202 – Physics Lab 1, PHY 212 – Physics Lab 2) and orally through presentations:

- PHY 201 (Physics 1): Students are required to give a presentation where they explain and solve a physics problem in front of the class. Presentations are 5 minutes.
- PHY 315 (Modern Physics): Students are required to give a presentation on a technological application made possible by a discovery made in modern physics. Presentations are 10 minutes and requires the student to perform independent research.
- PHY 480 (Numerical Physics): Presentation of a numerical solution to a physics problem to non-experts. Students are tasked with a difficult physics problem that cannot be solved exactly which requires the use of a computer algorithm to solve the problem numerically. Students are then asked to give a detailed presentation of the problem, the solution, and the results to a group of students below their level of physics knowledge in order to practice talking to non-peers about scientific concepts. Presentations should be 25-30 minutes and completely outline their project and results.

Quantitative Inquiry:

Quantifying the laws that govern our universe is the bedrock of physics. As such, every course in physics helps students develop and practice quantitative problem-solving skills.

Society and the Individual:

PHY 315 (Modern Physics) covers the last century of physics which saw a significant physics revolution in the early 20th century. Emphasis is placed on the historical aspect of physics and the implications it had on shaping the world throughout the 20th century though the development of nuclear, atomic, and quantum physics. Students are asked to contemplate the future of physics and any impacts it will have on our society as we become a technological civilization.

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NSSE Objectives Discussed Fall 2019

Program Alignment to NSSE Objectives

How did your program integrate the three NSSE objectives determined by the faculty this fall. The objectives were to 1) integrate more interdisciplinary work within the curriculum, 2) to connect learning to societal problems or issues, and 3) to examine the strengths and weaknesses of their (students) own views on a topic or issue. Please articulate which courses, and what assignments were assigned and how the work was assessed. Were the assignments successful? What could have made them more successful?

1. Unfortunately, due to the campus closing midmarch, plans for interdiciplinary work was abandoned. This will be picked up again in future semesters.

2. My physics students were tasked with brainstorming ideas for reducing the need for chemical fuels through the use of electromagnetism as a way of helping push humanity toward newer, and less environmentally destructive means for propulsion. This topic will be explored further during my seniors' research practicum next year.

3. While not part of the physics program, in the course Foundations of Science, students were asked to write a report in which they would examine, and strengthen thier argument through valid research, thier position on climate change. They were tasked in participating in a hypothetical argument with a climate change denier and what sources of evidence they would use to the contrary in order to convince the other person.

Curriculum Map

A - Assessed
R - Reinforced
I - Introduced
M - Master

Physics

	PHY 201	PHY 202	PHY 212	PHY 213	PHY 315	PHY 318	PHY 321	PHY 360	PHY 381
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.	I, A	I, A	R	R	M, A		R		
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.		I		A, I		R			R
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.	I		I				A, R		

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.					I			R	

	PHY 382	**PHY 421**	**PHY 422**	**PHY 450**	**PHY 460**	**PHY 480**	**PHY 490**	**MAT 124**	**MAT 214**	**MAT 215**	**MAT 224**	**MAT 312**
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.		R	R			M						
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.	R			M, A		M, A						
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.		M	M					R	R	R	R	R
PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.					R		M, A					

Changes to Curriculum

Are there any changes made to the curriculum map for this academic year? If so, please describe the program changes made along with the rationale for why and the impact the change should have on student learning?

Assessment Findings

Assessment Findings for the Assessment Measure level for Physics

PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.

PHY 201				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion A minimum of 85% of students will achieve an overall homework score of >85% been met yet? Met	23 out of 27 students (85%) achieved >85% on their overall homework score. Of the 4 students who did not make the cut, 3 were due to severe negligence and turned in less than 50% of the homework assignments. The class average for homework as an 89.6% with a 19.1% standard deviation. The standard deviation was so high due to the very low percentages of the 3 aforementioned students.		

PHY 202				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion At least 90% of students will complete all lab reports. been met yet? Not met	Only 23/27 students (85%) completed all lab reports. Of the 4 remaining, 1 student only missed 1 lab, while the other 3 missed several due to severe academic negligence (not turning in work).		- Curriculum Revision: In future, a policy will be put in place that automatically fails any student who misses more than 2 labs in the semester. It is hoped that this incentive will elicit a better work ethic among the students.

PHY 315				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 80% or greater on in-class exams been met yet? Met	All students achieved an average exam score greater than 80%. The class average for all exams was a 91.67%.		

PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.

PHY 213				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion At least 90% of students will complete all lab reports. been met yet? Not met	4/23 students did not complete every lab. With going online, many students struggled to keep up with online lab reports.		- Curriculum Revision: In future, stricter penalties for labs will be enforced. Students will be warned that missing more than 2 labs will result in failure of the entire course.

PHY 450				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 85% on student-designed experiments. been met yet? Not met	Course did not meet this semester.		

PHY 480				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 80% on course programming assignments. been met yet? Met	Both students achieved a 100% average on all course programming assignments.		

PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.

PHY 321				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 80% on in-class exams. been met yet? Not met	Course did not meet this year.		

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

PHY 490				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion All students will successfully compose a senior thesis. been met yet? Not met	Course did not meet thisyear.		

Analysis of the Assessment Process
Describe your assessment process; clearly articulate how the program is using course work and or assessment day activities for program assessment. Note any changes that occurred to that process since the previous year. Discuss what activities were successful at assessment and which ones were not as helpful and why. Please include who met to discuss the changes (unless you are a program of one person) and when you met. – Include a discussion on the process for collection and analysis of program data.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

Standard/Outcome	PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.
Legend	A
Course/Event	PHY 202
Assessment Measure	Direct - Class Assignment
Assessment Findings	Not met
Improvement Narrative	<table><tr><th>Improvement Type</th><th>Summary</th></tr><tr><td>Curriculum Revision</td><td>In future, a policy will be put in place that automatically fails any student who misses more than 2 labs in the semester. It is hoped that this incentive will elicit a better work ethic among the students.</td></tr></table>

Standard/Outcome	PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.
Legend	A
Course/Event	PHY 213

Assessment Measure	
Assessment Findings	Not met
Improvement Narrative	<table><tr><th>Improvement Type</th><th>Summary</th></tr><tr><td>Curriculum Revision</td><td>In future, stricter penalties for labs will be enforced. Students will be warned that missing more than 2 labs will result in failure of the entire course.</td></tr></table>

Program Activities

Student Performance Review

Describe the department assessment day activities if not already described previously. Please articulate the nature of the assessments are conducted, explain the process for assessment that happens on these two days. Include the schedule of assessment day for your program. What does the data and outcomes tell you? What changes will you make as a result of the data? What areas are successful for the program?

First Day:

Part 1: Students are asked to present a problem in physics at a level on par with thier recent course material to a panel of math and science faculty.

Part 1: Immediately following the problem presentation, students are interviewed by the faculty and asked about thier career goals and thier commentary on the physics program.

Second Day:

Part 3: Students are given a general physics test in order to keep track of thier mastery of the subject. Some material will be new to them, but over the yers, thier scores should improve as they continue the coursework and retake the test. The test takes approx. 3 hours.

Student Performance Review Schedule

Upload the program schedule for students during Performance Reviews.

Senior Showcase

Describe program Senior Showcase activities if not detailed previously in the report? What benefit does the program gain from the activities? What if any assessment of students happens during this event? What changes if any will occur due to what is learned by faculty on Senior Showcase?

No seniors are currently majoring in the program.

Assessment Rubrics
Upload rubrics used for Senior Showcase or Student Performance Reviews for student assessment.

Service Learning
Does the Program include projects/ course content that uses the philosophy of service learning?
Yes
No (selected)

Service Learning Component
If so, how is service learning infused in the coursework within your department? Is service or community engagement in the program mission? Describe the Service Learning Activities that your students and department engaged in this past year. How did the activities improve student learning? How did the activities benefit the community?

LEAD Events
Highlight lead events sponsored by program faculty that are connected to program or general education objectives for the past academic year. Include a total number of lead events program faculty sponsored.

Two LEAD events hosted by Dr. Sean Baldridge. Both were related to the Astronomy Club and involved learning about and looking at certain celestial objects.

Student Accomplishments
Highlight special examples of student successes in the field (academic: mentor-mentee, conference presentations, competitive internship, journal acceptance; extra-curricular: horse show championship, art exhibit). This is for any accomplishments that a student achieved outside of course work or the normal expectations of student success.

N/A

Alumni Accomplishments
Please highlight special examples of any successes of recent graduated alumni (acceptance or graduation graduate school, employment or professional milestones. Include recent graduates.

N/A

Faculty Accomplishments
Highlight special examples of faculty success in the profession/field/content area. This is for any accomplishment of a faculty activity/research/professional nature.
Dr. Baldridge Submitted a Cox Distinguished Professorship proposal for the 20/21 academic year.

Assessment Rubric

Annual Assessment Rubric 2018 — 21.000 pts 63.64%

	3.000 Exceeds	2.000 Meets	1.000 Falls Below Expectations	N/A
Mission Statement Clearly Articulated weight: 1.000	The mission statement for the program is insightful and forward thinking. It aligns with the University Mission and learning objectives showing a clear alignment between the University and the program.	✔ The mission statement for the program clearly articulated and aligned with the University mission.	The mission statement is minimal at best.	N/A
Comment:				
Reflection on Retention weight: 1.000	The program provides a detailed description on the retention numbers. The program provides new ideas on how to improve retention of their program students or articulates what they are currently doing to keep students in their program.	✔ The program provides a basic reflection on the retention data provided.	The program does not reflect on retention data in a detailed way.	N/A
Comment:				
Defines External Accreditation Standards weight: 1.000	The program provides a detailed explanation of the accreditation organizations within the field along with all the timeline and supplemental information required for accreditation.	The program provides a basic explanation of the accreditation organizations in the field.	The program fails to provide any accreditation information.	✔ N/A
Comment:				
General Education alignment clearly explained weight: 1.000	The program provides a detailed explanation of the General Education criterial and how the basic skills learned are expanded upon in the program. Details include but are not limited to: specific courses, or activities that stretch the knowledge of the specific areas.	✔ The program provides a basic explanation of the General Education curriculum and how the skills learned are expanded in program courses.	The program provides a minimal explanation of the General Education curriculum and how the skills learned are expanded in program courses.	N/A
Comment:				
Curriculum Map alignment weight: 1.000	The curriculum map is detailed and complete.	✔ The curriculum map is complete	The curriculum map is not complete	N/A
Comment:				
Assessment of Objectives weight: 1.000	Assessment of objectives are spread out across the curriculum with a variety of assessment measures and each program objective is assessed a minimum of twice a year.	✔ Each objective is assessed a minimum of 2 times a year or an assessment rotation is explained so that all objectives are assessed. The assessments are not concentrated in one class.	The assessment map is not complete or much of the assessment happens in only one course. Not all objectives are assessed annually, nor is a plan provided on assessment.	N/A
Comment:				
Data Driven Decision-making is explained weight: 1.000	Curricular and assessment changes are articulated and validated through data based decisions. Faculty discuss the data that lead to curricular decisions being made.	✔ Curricular and assessment decisions are made based on data provided in assessment, but detailed alignment is not provided as justification for the change.	Changes are proposed and brought forth with little explanation on the data included in the decision, if data was included in the decision.	N/A

Documentation provided on assessment findings weight: 1.000	The program uploads all rubric and support information to support the claims in the assessment findings along with detailed instructions on the assessment process and data analysis.	✓ The program uploads all rubric and support information to support the claims in assessment findings.	The program did not upload the data to support assessment claims in the assessment findings.	N/A
Comment:				
Analysis of Assessment is complete weight: 1.000	The program completed assessment findings for each component identified, and provided a comprehensive summary of each assessment measure identified in the report.	✓ The program completed the assessment findings for each component and provided a summary for each assessment measure.	The program did not provide a completed assessment findings for each component, nor did they complete the summary for each measure.	N/A
Comment:				
Improvement narratives are selected with intentionality weight: 1.000	The program identified Improvement Narratives that appear to move the program forward and see the bigger picture than only the specific program curriculum options	The program used the provided Improvement Narratives and selected options that made sense to the objectives and issues within the assessment.	✓ The program did not use any improvement narratives, or the ones chosen are not aligned with assessment results.	N/A
Comment:				
Student Performance Review weight: 1.000	The program described and provided a detailed account of Student performance Review activities. Data evidence provided and detailed.	✓ The program provided the schedule and a brief description of Student Performance Review with data of the results.	The program did not provide complete explanation on Student Performance Review nor did they provide data results.	N/A
Comment:				
Senior Showcase weight: 1.000	The program had all senior students participate in Senior Showcase and provided a detailed explanation of their expectation and the presentations presented.	The program described the Senior showcase activities and provided some evidence of what was presented.	Little to no content of Senior showcase was provided.	✓ N/A
Comment:				
Co Curricular activities weight: 1.000	The program detailed the activities of LEAD and other co-curricular programing that was provided throughout the year. They provided numerous events for students.	✓ The program provided a listing of LEAD events and activities provided.	The program provided little to no description of the Co-curricular activities provided throughout the year.	N/A
Comment:				
Faculty, alumni, and Student accomplishments weight: 1.000	The program provided detail updates on successes on Students, Alumni and Faculty with added information explaining the kinds of success that were experienced.	The program provided a listing of information on Students, Alumni, and faculty accomplishments.	The program provided little to no data on students, alumni, faculty accomplishments.	✓ N/A
Comment:				

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Template: /Users/carriemccray/Library/Group Containers/UBF8T346G9.Office/User Content.localized/Templates.localized/Normal.dotm
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WILLIAM WOODS
UNIVERSITY

Physics Annual Assessment 2018-2019

Annual Assessment 18-19

Physics

Program Profile

Program Mission Statement
Please insert your program mission statement here

The primary objective of the physics program is to help students learn to develop and accurately apply mathematical and analytical processes to descriptions and models of systems in the natural world. This is done through hands-on lab work, original research, and traditional coursework. The skills acquired in this program will prepare students to pursue a wide range of technical careers as well as further education.

Program Data

Delivery Method

Traditional On Campus (selected)
Online
Hybrid

	Majors	**Minors**
2017-2018	**2**	**2**
2018-2019	**3**	**4**

Concentrations 2017-18
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

N/A

Concentrations 2018-19
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

N/A

Student Demographics
What are the program goals for student retention, persistence and degree completion? What do the persistence numbers mean to the faculty in the program? Are your persistence numbers what you expected? If not, how could the numbers be improved? What is the optimal enrollment for the program?

The program has the following goals for retention and growth during the 2018-2019 school year:

-Retain all current physics majors and recruit one additional physics major

-Retain at least 90% of the current physics minors and recruit two additional physics minors

These goals will help to ensure that the programs remain viable going forward. Both degrees have been monotonically increasing in enrollment since their introduction. While this growth is expected to remain relatively slow, the goal is to maintain a steady increase. Both programs could grow significantly before reaching optimal enrollment.

Is the Program Externally Accredited

Yes
No (selected)

External Accreditation
Name the Accrediting Agency or entity including the last review/approval. Is there an accrediting body for the field of study? If yes, what is the name of the group. Is the program seeking accreditation?If no, why?

There are currently no accrediting agencies for a program of this type.

Marketing Materials
Please reflect on the current marketing materials used for the program. Detail what documents you are reviewing and attach a screenshot of any webpages or materials that you cannot include as a document. What changes, if any should be made to the material? Are there recommendations for how or where to market the program?

Marketing Material

Program Assessment

Standard/Outcome

Identifier	Description
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.
WWU2016.2	Ethics: Students will exhibit values and behaviors that address self- respect and respect for others that will enable success and participation in the larger society.
WWU2016.3	Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.
WWU2016.4	Lifelong Education: Students will possess an intellectual curiosity and desire for continual learning both within and beyond formal education in preparation for participation in a global society.

Additional Standards/Outcomes

Identifier	Description
PHY.1	Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.
PHY.2	Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.
PHY.3	Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.
PHY.4	Students will practice the scientific method and the processes involved in conducting original scientific

	research, along with the communication and presentation of their findings.

General Education Alignment to Program

How do the General Education criteria align with the Program Objectives? What courses within your program build upon skills learned in general education courses (please list the program course and the general education criteria). The General Education clusters are: Critical Analysis, Creative Expression, Quantitative Inquiry, and Society & the Individual. See attached for more detailed breakdown.

This program compliments several objectives from the general education program, mostly in the 'Quantitative Inquiry' cluster. In PHY 202 - Physics II, students develop and practice quantitative problem-solving skills when completing course homework assignments. In PHY 213 - Physics II Lab, students analyze and evaluate information in a larger context when completing laboratory assignments. Students are given lab manuals and are expected to read instructions, perform preliminary calculations, and apply concepts from the lecture in order to conduct their experiment. These skills are consistent with the GE description for the natural sciences.

The program also builds on skills developed in the 'Critical Analysis' cluster. Students are expected to apply logical and analytical reasoning skills to diverse source material when they conduct literature reviews in PHY 490 - Senior Research. This course often involves case studies and independent investigation in which students must use recent literature to guide their research direction. Students are often expected to read original articles and determine objectives for future research. These skills build upon and are consistent with the description given for critical thinking.

GE_Cluster_Descriptions_FINAL_Version_Approved.docx

Curriculum Map

A - Assessed
R - Reinforced
I - Introduced
M - Master

Physics(Imported)(Imported)

	PHY 201	PHY 202	PHY 212	PHY 213	PHY 315	PHY 318	PHY 321	PHY 360	PHY 381	PHY 382	PHY 421
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.	I, A	I, A	R	R	M, A		R				R
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.		I		A, I		R			R	R	
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.	I		I				A, R				M

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.					I			R			

	PHY 422	PHY 450	PHY 460	PHY 480	PHY 490	MAT 124	MAT 214	MAT 215	MAT 224	MAT 312
PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.	R			M						
PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.		M, A		M, A						
PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.	M					R	R	R	R	R
PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.			R		M, A					

Changes to Curriculum

Are there any changes made to the curriculum map for this academic year? If so, please describe the program changes made along with the rationale for why and the impact the change should have on student learning?

Assessment Findings

Assessment Findings for the Assessment Measure level for Physics(Imported)(Imported)

PHY.1 Students will achieve an advanced understanding and appreciation for the physical laws governing the universe, through conceptual problem solving and laboratory experience.

Assessment Measures

PHY 201				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion A minimum of 85% of students will achieve an overall homework score of >85% been met yet? Met	14 out of 16 students (87.5%) achieved an overall homework score >85%. The average homework score for the class was a 91.7% with a standard deviation of 11.6%.		

PHY 202				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion At least 90% of students will complete all lab reports. been met yet? Not met	13 out of 16 students (81%) completed all labs.		

PHY 315				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 80% or greater on in-class exams been met yet? Not met	The class average for all exams was an 86.4% with a standard deviation of 12.6%. However, 1 of the 3 students did not achieve an average exam score >80% therefore based on an interpretation of the stated criterion (which does not specify class average or individual average) it has not been met.		

PHY.2 Students will learn to model and simulate complex physical interactions computationally, they will design, construct, and program experimental apparatuses to test theories.

Assessment Measures

PHY 213				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion At least 90% of students will complete all lab reports. been met yet? Not met	14 out of 16 students completed all labs (87.5%).		

PHY 450				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 85% on student-designed experiments. been met yet?			

PHY 480				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion An average score of 80% on course programming assignments. been met yet?			

PHY.3 Students will develop sophisticated mathematical and numerical skills, allowing them to quantitatively understand and predict the behavior of physical systems.

Assessment Measures

PHY 321				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Quiz/Exam	Has the criterion An average score of 80% on in-class exams. been met yet? Met	1 student was enrolled in the course and achieved a 94% exam average.		

PHY.4 Students will practice the scientific method and the processes involved in conducting original scientific research, along with the communication and presentation of their findings.

Assessment Measures

PHY 490				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
	Has the criterion All students will successfully compose a senior thesis. been met yet?			

Analysis of the Assessment Process

Describe your assessment process; clearly articulate how the program is using course work and or assessment day activities for program assessment. Note any changes that occurred to that process since the previous year. Discuss what activities were successful at assessment and which ones were not as helpful and why. Please include who met to discuss the changes (unless you are a program of one person) and when you met. – Include a discussion on the process for collection and analysis of program data.

Data will be collected from owlnet during the 2018-2019 school year.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

No improvement narratives have been added.

Program Activities

Student Performance Review

Describe the department assessment day activities if not already described previously. Please articulate the nature of the assessments are conducted, explain the process for assessment that happens on these two days. Include the schedule of assessment day for your program. What does the data and outcomes tell you? What changes will you make as a result of the data? What areas are successful for the program?

Assessment activities will be developed prior to achievement days. Options for field tests are currently being explored in addition to oral exams and/or presentations. Interviews will likely also be incoproated into the process.

Student Performance Review Schedule

Upload the program schedule for students during Performance Reviews.

Senior Showcase

Describe program Senior Showcase activities if not detailed previously in the report? What benefit does the program gain from the activities? What if any assessment of students happens during this event? What changes if any will occur due to what is learned by faculty on Senior Showcase?

No seniors are currently majoring in the program.

Assessment Rubrics

Upload rubrics used for Senior Showcase or Student Performance Reviews for student assessment.

Service Learning

Does the Program include projects/ course content that uses the philosophy of service learning?

Yes

No (selected)

Service Learning Component

If so, how is service learning infused in the coursework within your department? Is service or community engagement in the program mission? Describe the Service Learning Activities that your students and department engaged in this past year. How did the activities improve student learning? How did the activities benefit the community?

LEAD Events

Highlight lead events sponsored by program faculty that are connected to program or general education objectives for the past academic year. Include a total number of lead events program faculty sponsored.

Dr. Sean Baldridge hosted 1 LEAD event titled "The Stellar Circle of Life" that explored the history of the universe from the big bang to today and how stars are element factories.

Student Accomplishments

Highlight special examples of student successes in the field (academic: mentor-mentee, conference presentations, competitive internship, journal acceptance; extra-curricular: horse show championship, art exhibit). This is for any accomplishments that a student achieved outside of course work or the normal expectations of student success.

Alumni Accomplishments

Please highlight special examples of any successes of recent graduated alumni (acceptance or graduation graduate school, employment or professional milestones. Include recent graduates.

Faculty Accomplishments

Highlight special examples of faculty success in the profession/field/content area. This is for any accomplishment of a faculty activity/research/professional nature.

Annual Assessment Rubric 2018

22.000 pts 56.41%

	3.000 Exceeds	2.000 Meets	1.000 Falls Below Expectations	N/A
Mission Statement Clearly Articulated weight: 1.000	The mission statement for the program is insightful and forward thinking. It aligns with the University Mission and learning objectives showing a clear alignment between the University and the program.	✓ The mission statement for the program clearly articulated and aligned with the University mission.	The mission statement is minimal at best.	N/A
Comment:				
Reflection on Retention weight: 1.000	The program provides a detailed description on the retention numbers. The program provides new ideas on how to improve retention of their program students or articulates what they are currently doing to keep students in their program.	✓ The program provides a basic reflection on the retention data provided.	The program does not reflect on retention data in a detailed way.	N/A
Comment:				
Defines External Accreditation Standards weight: 1.000	The program provides a detailed explanation of the accreditation organizations within the field along with all the timeline and supplemental information required for accreditation.	✓ The program provides a basic explanation of the accreditation organizations in the field.	The program fails to provide any accreditation information.	N/A
Comment:				
General Education alignment clearly explained weight: 1.000	The program provides a detailed explanation of the General Education criterial and how the basic skills learned are expanded upon in the program. Details include but are not limited to: specific courses, or activities that stretch the knowledge of the specific areas.	The program provides a basic explanation of the General Education curriculum and how the skills learned are expanded in program courses.	✓ The program provides a minimal explanation of the General Education curriculum and how the skills learned are expanded in program courses.	N/A
Comment:				
Curriculum Map alignment weight: 1.000	The curriculum map is detailed and complete.	✓ The curriculum map is complete	The curriculum map is not complete	N/A
Comment:				
Assessment of Objectives weight: 1.000	Assessment of objectives are spread out across the curriculum with a variety of assessment measures and each program objective is assessed a minimum of twice a year.	✓ Each objective is assessed a minimum of 2 times a year or an assessment rotation is explained so that all objectives are assessed. The assessments are not concentrated in one class.	The assessment map is not complete or much of the assessment happens in only one course. Not all objectives are assessed annually, nor is a plan provided on assessment.	N/A
Comment:				
Data Driven Decision-making is explained weight: 1.000	Curricular and assessment changes are articulated and validated through data based decisions. Faculty discuss the data that lead to curricular decisions being made.	✓ Curricular and assessment decisions are made based on data provided in assessment, but detailed alignment is not provided as justification for the change.	Changes are proposed and brought forth with little explanation on the data included in the decision, if data was included in the decision.	N/A

Documentation provided on assessment findings weight: 1.000	The program uploads all rubric and support information to support the claims in the assessment findings along with detailed instructions on the assessment process and data analysis.	The program uploads all rubric and support information to support the claims in assessment findings.	The program did not upload the data to support assessment claims in the assessment findings.	N/A
Comment:				
Analysis of Assessment is complete weight: 1.000	The program completed assessment findings for each component identified, and provided a comprehensive summary of each assessment measure identified in the report.	The program completed the assessment findings for each component and provided a summary for each assessment measure.	The program did not provide a completed assessment findings for each component, nor did they complete the summary for each measure.	N/A
Comment:	The missing assessment data was due to the course not being taught.			
Improvement narratives are selected with intentionality weight: 1.000	The program identified Improvement Narratives that appear to move the program forward and see the bigger picture than only the specific program curriculum options	The program used the provided Improvement Narratives and selected options that made sense to the objectives and issues within the assessment.	The program did not use any improvement narratives, or the ones chosen are not aligned with assessment results.	N/A
Comment:				
Student Performance Review weight: 1.000	The program described and provided a detailed account of Student performance Review activities. Data evidence provided and detailed.	The program provided the schedule and a brief description of Student Performance Review with data of the results.	The program did not provide complete explanation on Student Performance Review nor did they provide data results.	N/A
Comment:	The program is working on a schedule.			
Senior Showcase weight: 1.000	The program had all senior students participate in Senior Showcase and provided a detailed explanation of their expectation and the presentations presented.	The program described the Senior showcase activities and provided some evidence of what was presented.	Little to no content of Senior showcase was provided.	N/A
Comment:				
Co Curricular activities weight: 1.000	The program detailed the activities of LEAD and other co-curricular programing that was provided throughout the year. They provided numerous events for students.	The program provided a listing of LEAD events and activities provided.	The program provided little to no description of the Co-curricular activities provided throughout the year.	N/A
Comment:				
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Comment:				