

**Agenda and Evaluation Report for Audit & Review Face-to-Face Meeting
University of Wisconsin-Whitewater
Physics Majors and Minors, 2017-2018**

Date: 4/26/2018

Time: 3:00-4:00 p.m.

Place: Upham 168

Attended: Provost Susan Elrod; AVC Greg Cook; Dean David Travis; Department Chair Robert Benjamin; faculty and staff in the Physics program; Audit & Review Team Chair Louise Tourigny; Audit & Review team members Corey Davis, Barbara Bren, Lopamudra Mukherjee, Joan Littlefield Cook

- 1) Call to order
- 2) Introductions
- 3) Overview of review team evaluation, program comments: The team is impressed with the accomplishments of faculty in the areas of partnerships with other institutions and other UW-W programs, research, grants and support for student involvement in research and participation in the undergraduate research days. The team noted the considerable one-on-one attention students receive and the opportunities for students to learn outside of the classroom by engaging in activities with the Innovation Center among others. The Program has been well managed over the last five years and provided support for General Education and other programs on campus. AVC Greg Cook noted that the program is reflective and data-based, systematic and in control of planning for their future. He added that the historical context provided in the self-study was appreciated, as was the strong and positive response to previous A&R recommendations.

The program noted that it was valuable to pull the information together for the self-study, contributing to more discussion of student issues, growth, etc. The program would like to do more systematic and focused outreach to schools, develop more connections with industry, and explore new opportunities with the Rock County campus. They also would like to develop Applied Physics and interdisciplinary programs. Enrollment has been very good; compared to other programs nationally, this is a large program.

- 4) Discussion of Review Team's evaluation:
 - a) Mission and objectives. The process for goal setting, the relationships between goals and the department's mission and vision could be clearer.
 - b) Curricular changes. How documented data get utilized in curricular changes should be clearly articulated. What impact might the addition of UW-Rock County have on the program (in curriculum, programs, or any other ways)?
 - c) Assessment Process. Most assessment data is collected at the end of the program. Assessing mid-level courses in terms of student learning outcomes (SLO) is important. It is not clear how Junior/Senior Seminar is assessed in relation to SLO. Assessment does not look at how introductory/intermediate courses meet program objectives.
 - d) Student recruitment and graduation. Students come to the major late in their academic careers. Find strategies to identify majors earlier in their college careers so that they can graduate within four years. Recruitment of female students needs more effort. Continue to track graduates through a more formal system.
 - e) Resources. As the program pursues stronger connections with other universities, the region and industry for partnerships, internships, jobs and the recruitment of talented students, offers on-

line courses, and plans for potential increases in enrollment, has it considered the resources necessary to facilitate the coordination of all its activities?

Related to the points above, there was discussion of:

- *Enrollment trends and strategies* to deal with changing demographics and encouraging greater enrollment of female students (e.g., make sure to have both a male and female learning assistant for the Intro Physics course). The merger with UW-Rock County presents opportunities but also challenges (e.g., how to ensure that UW-Rock students who complete an Engineering degree at UW-Platteville are included in UW-Whitewater's Physics program enrollment numbers). One suggestion was to offer a 3+1 degree for Physics and Engineering.
- *Curricular changes*. The curriculum was significantly changed in 2007 and the program is still building the reputation of a program that addresses more than physics education. More students are going on to Ph.D. programs.
- *Staffing*. There are two FTE to support the major; the rest of FTE goes to service courses. The program is meeting the service needs of campus, but are doing so by offering summer courses. If more students enroll from Rock County, more staff will be needed.
- *The Observatory*. The goal is to make the Observatory a science outreach center.
- *Engineering program*. There was discussion of possibilities regarding an Engineering program in terms of faculty, space, equipment, and students. These discussions are preliminary, but UW-Rock County has relevant resources. One strategy might be to add an Engineering program at the UW-Rock County campus. The program would need a 'remote' room in Upham Hall to be able to offer point-to-point instruction.
- *Sustainability of processes*. The program is encouraged to make sure the processes they have developed for program planning, decision-making, and assessment are 'institutionalized' in the program so they are sustainable over changes in time and staff.

5) **Recommended Actions:** The evaluation report lists 3 recommended actions (see page 13, point 4) related to connections with the region, resources, and assessment.

6) **Recommended Result:** *Continuation without qualification*

- Please make use of the detailed comments in the evaluation report (below).
- Because the recommended result of this review is to continue without qualification, the program's next full self-study will be a "short" one focused on the recommended actions from the current report. This short self-study is due **October 2022 to the Dean of the College of Letters & Sciences and November 1, 2022 to the chair of the Audit & Review Committee.**

7) Adjourn.

Submitted by Louise Tourigny.

**University of Wisconsin-Whitewater
Committee Form: Review of Audit & Review Self-Studies
Undergraduate Programs, 2017-2018
Majors/Minors and Standalone Minors**

Date of Evaluation 3/12/18

Short Self Study (SS*) _____

Program Physics

Major X

Minor X

Evaluations submitted by: Louise Tourigny (review team chair), Corey Davis, Barbara Bren, Lopamudra Mukherjee, Joan Littlefield Cook

Review meeting attended by: Louise Tourigny, Joan Littlefield Cook, Lopamudra Mukherjee, Corey Davis, Barbara Bren

I. Program Purpose & Overview: A. Centrality

1. The program contributes to the fulfillment of UW-Whitewater's core values, Mission, and Strategic Plan.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

2. The program supports general education, proficiency, and/or other programs at UW-W.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3. The program has achieved or is appropriately working toward achievement of at least two goals of Inclusive Excellence.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

4. The program has been responsive to actions recommended from the previous Audit and Review Report; Progress Reports have been submitted, if relevant.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1. The history/timeline is very interesting--thanks!
2. The program provides support for General Education with several electives (which will need recertification) and offers courses for students in elementary education, music, art, MAGD, OESH, and other programs. It also offers students who are fans of sci fi or aspire to write sci fi an appealing course as well!
3. Served minorities
4. Program is making great progress with assessment plan.

4. It's fine that the department decided against setting numerical enrollment targets, but please provide more information about the reasons for that decision.
4. Interesting addition of requiring students to develop and submit resumes. What are you learning from your review of these?

I. Program Purpose & Overview: B. Program Mission, Goals, & Accomplishments

1. The program's mission statement reflects the nature and scope of the program.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

2. Goals and objectives were identified and undertaken to improve or advance the program.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3. The program has a process for setting and assessing goals, and making decisions about changes to the program goals.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

4. The program is considering potential revisions to mission, goals, or objectives; the program has a "vision" for where it wants to be in the future and how to get there.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

5. The program, faculty/staff, and/or students have earned recognition or awards.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

6. The program has achieved or maintained program-level accreditation or has considered seeking it, where appropriate.

Sufficient Evidence	0
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	5

Comments

1. I admire the mission. It is very well-rounded, and rather than just serving majors or minors who are aimed at careers or further study, it is inclusive of physics courses as contributing to a liberal education, and also gives weight to the importance of public outreach.
3. What is the relationship between goals set and the department mission? Has the move to a winter break program planning meeting been effective?

3. Process of goal setting not clear. Is there any evidence to come up with this specific goals? Some of the answers outlined in Q4 does not address goals set in Q2, neither is it clear what data led them to think of these revisions.
4. The program has a clear vision for the near future and has set goals that are reasonable and likely to be effective in achieving that vision. The emphasis on integrating the program into the regional network of employers and schools is an important one.
4. Reconstituting the Physics Department Advisory Council is a very good idea.
4. These are exciting--but ambitious--goals.
4. It will be interesting to see how the integration with Rock County unfolds, since there is an agreement with UW-Platteville for an ABET-accredited electrical engineering BS degree (up for review in 2018/19), and some pre-engineering courses may be waived for students with training or experience.
5. Impressive accomplishments!
6. No accreditation available.

II. Assessment: A. Curriculum

1. The program has a clearly articulated, efficient, and purposeful curriculum, including options or emphases within the program (if applicable).

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

2. If program offers dual-listed courses, the expectations of graduate students differ from undergraduate students; otherwise NA

Sufficient Evidence	0
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	5

3. Appropriate assessment data were used in making curricular revisions.

Sufficient Evidence	3
Some/Partial Evidence	2
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

4. The program provides opportunities for students to learn in ways that extend beyond the classroom, and discussed the extent to which students are involved in these activities and opportunities.

Sufficient Evidence	5
Some/Partial Evidence	0
Not Applicable (explain why in comments below)	0
No/Limited Evidence	0

5. Online courses are evaluated in ways that ensure effective delivery, continuous improvement, and student learning (if applicable)

Sufficient Evidence	2
Some/Partial Evidence	3
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1. Very nice that the program arranges courses so that all majors have at least one course with each faculty member within their first 2 years. Great way to introduce students to different areas of research, get them interested in working with faculty.
- 1 & 3. It is apparent that the department is looking very closely at its curriculum, responding to both student performance and feedback, as well as paying attention to enrollment. Well-considered changes are being made.
3. Faculty used indirect data and some direct data on student performance in making changes. As more direct data become available, I encourage the program to make even more use of the information on students' skills.

3. Low industry emphasis enrollment numbers drove merger of the engineering and industry emphases.

3. Some curricular revisions are based on assessment data, but not all. Try to articulate the data on which each decision is based.
4. Support for student involvement with research, working with students on their resumes (beginning very early), and the travel/study offerings are all commendable.
5. Should articulate how documented data is used in curricular changes. Is the reference to changes in student evaluation scores about course evals? If so: There was concern about using data analysis in place of outdoor observing for 112, but there was no mention of whether direct assessment/student performance (or grade distribution) has been affected due to this change. The report states that the lab has been modified every summer, but not what was the objective of the modifications. Are the lab learning outcomes from the outdoor observation so different from the learning outcomes for the data analysis that student performance cannot be compared? The only assessment of the third course (150) is the enrollment. When offered as a face-to-face course, is it usually at capacity?

5. Online course evaluation lower than in class. Need to assess how on line delivery can be improved.

5. Not much has been done for evaluating online courses.

II. Assessment: B. Assessment of Student Learning

1. The program has a clearly articulated learning outcomes for students, courses are "mapped" to these learning outcomes, and some outcomes received specific attention during the review period.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

2. Student learning outcomes are aligned with the LEAP Essential Learning Outcomes in a way that is reasonable and meaningful.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3. The program has an appropriate assessment plan for measuring students' progress in attaining the outcomes.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

4. The program collected a variety of appropriate assessment data allowing judgments about the extent to which students are achieving learning outcomes.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0

Not Applicable (explain why in comments below) | 0

5. Program faculty consider assessment data in making changes to the curriculum, students' learning outcomes, and/or other aspects of the program.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

6. Results of assessment efforts have been shared with appropriate internal and external constituencies.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1. The SLOs are good in terms of breadth and depth of knowledge and skills.
1. I encourage the program to make some minor revisions to the way the SLOs are stated. For example, I advise changing the wording "Students will be able to...." and "Students should know..." to simply "Students will..." (we can only tell if they do demonstrate knowledge or skills, not necessarily if they are able to). This is a minor change in wording, but it conveys an important difference.
2. If the oral and written presentations involve research (lit review), shouldn't LEAP information literacy be mapped to them as Physics LOs? Possibly the capstone course's writing project provides an opportunity to assess information literacy.
3. The student progress database sounds like something other departments might be interested in hearing about! Would this work for larger programs, or be impractical?
3. Working with students on resumes sounds like a good way to help them think about the reasons for their courses and other activities.
3. Reconstituting the advisory council sounds like an excellent idea. Perhaps including people involved with the Rock program, as these programs merge somehow, will be desirable.
3. Both direct and indirect data and both external and internal measures are included in the assessment plan.
3. Do you have any information about interrater agreement in applying the lab skills, writing, and presentation assessments? Doing this for a small sample or student work would demonstrate that the rubrics are being interpreted and used in similar ways by different faculty. No need to double-score all student work, just a small sample. Do you have a discussion on disagreements in scores?
3. The lab skills assessment is a novel and (I assume) very useful measure. Please consider sharing it with other lab sciences on campus if you haven't already. Same for the resume rubric, once that is fully developed and implemented--this is a measure that many programs would likely find useful.
3. The Student Progress Database is, in many ways, a way of tracking student participation in HIPs.
3. Have you identified any trends in why students leave the major?
5. Good use of the MFT data in considering changes to the program.
5. Is the MFT still given before the important courses relevant for the test? Clarify the sequence of taking courses and the MFT.
5. For the anticipated changes in the Exit Survey (i.e., changing to an online survey)--consider adding these to the university SOAS if you haven't already and requiring your students to take this rather than adding another online survey. If timing of the survey is an issue, talk with the Office of Academic Assessment about possible solutions.
5. For the Lab Skills assessment, looks like there has been a shift toward more students in the Exceeds and Meets categories (except F2016, when there was only 1 student assessed). When you collate over years (maybe combining groups of 3 years?), do students seem to be improving?
5. Good description of the PROCESS of considering assessment data in making curricular and within-course changes.
6. Good that you are sharing the data with students, especially the first-year majors so they can see what students tend to have difficulty with.

Most of the assessment data is collected at the end of the program. It may not give them a sense of how the mid-level courses are working in terms of meeting the program SLOs. Not clear how Junior/Senior Seminar is assessed (is there a rubric that maps to the SLOs). The database sounds like a good idea, but could have much more info. MFT score have steadily dropped since 2008, the answer tries to justify this phenomenon. Has the program done anything to address this issue or discussed the possibility of making the courses with the worst outcomes mandatory. Laboratory assessment can be more-fine grained and tied to specific SLOs.

III. Student Recruitment, Enrollment, Retention, and Graduation: A. Trend Data

1-2. Five-year enrollment and graduation trends reflect program vitality and sustainability.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3. [MAJORS ONLY] Credits-to-degree show that students can complete the degree in four years, or reasonably efficiently.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

4. Program has strategies to recruit and retain diverse students.

Sufficient Evidence	1
Some/Partial Evidence	4
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

5. [MAJORS ONLY] Composition of students approximates or exceeds the diversity of students at the University

Sufficient Evidence	2
Some/Partial Evidence	3
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

6. Students can enroll in appropriate courses and proceed without delaying graduation.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

7. Claim that the program is oversubscribed, undersubscribed, or at optimum level is justified or supported by examples or data.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1-2. Interesting and detailed analysis of enrollment and retention data within the major.

- 1-2. Why do you think more students are enrolling in and graduating with a physics major? Has the engineering 5 year dual degree opportunity had an impact? Do you think this will be affected by our restructuring with UW-Rock County (which has worked with UW-Platteville on engineering degrees)?
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- 3., 6. The program also is aware of the challenges of the math readiness and late declaration of students.
3, 6. Students come to the major late.
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- 4.-5. Recruiting and retaining diverse (by ethnicity and gender) Physics majors and minors is a challenge, and not unique to this institution. The program is aware of the challenge. Female enrollment is lower but the % of enrollment matches the national average.
5. Rates are reflective of the field but not of the university.
5. The self-study says that fewer than 10% of majors at any given time are from URM groups, but I'm not following where that percentage comes from. If I'm understanding the data correctly, about 15% of Physics majors over the review period are URM students (African American, Hispanic, SE Asian, 2 or more), which is about the same as the university as a whole. Female enrollment (15% overall), however, is much lower than the university average (which the self-study discussed).
7. It appears that the department is stretched thin to accommodate the size of the program, but their students are receiving a lot of one-on-one feedback, while the faculty are still progressing to tenure and promotion.
7. The self-study mentions the need for additional faculty if enrollments continue to increase. Will additional lab spaces also be needed?
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the retention numbers are promising In the answer to q4, it is not clear how these measures are aiming at diversity

III. Student Recruitment, Enrollment, Retention, and Graduation: B. Demand for Graduates

1. [MAJORS ONLY] Placement information indicates that program graduates find employment or continue their education.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

2. Data suggests that employment opportunities for graduates of this program will remain strong.

Sufficient Evidence	3
Some/Partial Evidence	2
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3. The program systematically tracks graduates of the program.

Sufficient Evidence	2
Some/Partial Evidence	3
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

2. Are there sources that address the projected market for Physics graduates (and the related fields you mentioned), such as the Bureau of Labor Statistics?
2. The Occupational Outlook Handbook (<https://www.bls.gov/ooh/>) says that the projection for physicists and astronomers, 2016-2026, is 14% (higher than the 7% outlook for all occupations), but those jobs usually require the Ph.D. The projection for demand for mechanical and electrical engineers is to grow at the average of all occupations. The dual degree option is noted by the program as an advantage. The merger with Rock (and its degree agreement with Platteville) will be interesting.
3. Good work on this so far. As the self-study notes, a more formal system may be needed as the number of graduates continue to grow.
-
3. The challenges in finding ways to track alumni are not unique to this program.

3. When graduates do not get employment or do not seek employment it would be important to know why.
 Department should formalize the process of tracking graduates. Easiest ways are LinkedIn or a facebook page.
 Another possibility is hold some alumni events.

III. Student Recruitment, Enrollment, Retention, and Graduation: C. Comparative Advantage(s)

1. The program has unique features that distinguish it from competing programs--giving it a competitive edge

Sufficient Evidence	2
Some/Partial Evidence	3
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1. First regional comprehensive to re-negotiate dual degree agreement with UW-Madison.
 1. Benchmark the program against other programs in the State and at similar comprehensive colleges in the Midwest to assess its strengths and weaknesses.
 Could emphasize close interaction of students with faculty doing high-level research as a comparative advantage.
 The idea of teaming up with another department like CS seems like a good idea. If the physics students have more computation skills, they will definitely be more attractive in the job market.

IV. Resource Availability & Development: A. Faculty Characteristics

1-2. Information is provided about the composition of the department faculty & instructional academic staff (e.g., gender, ethnicity, expertise, academic rank, etc.)

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

3-4. The program has identified staffing changes and anticipated areas of potential future need.

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1-2. I don't see a female tenure-line faculty member (but is an academic staff member).
 3-4. Provide more evidence on current research programs and how these align with program needs and future development.
 the answers for 1-2 do not address all the issues asked such as gender, ethnicity. This should have been provided in a table format

IV. Resource Availability & Development: B. Teaching & Learning Enhancement

1-2. Faculty & instructional academic staff are engaged in activities to enhance teaching and advising.

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

None

IV. Resource Availability & Development: C. Research & other Scholarly/Creative Activities**1-2. Faculty (and staff, if relevant) are active in research and/or scholarly/creative activities.**

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

Faculty are active in research and publishing
 Most faculty are active in research

IV. Resource Availability & Development: D. External Funding**1-2. Faculty and staff (if relevant) pursue funding through grants, contract, and/or gifts.**

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

Impressive funding efforts and successes.
 1-2. Very impressive grant support!
 Grant funding seems good considering a smaller department

IV. Resource Availability & Development: E. Professional & Public Service**1-2. Faculty (and staff, if relevant) are active in professional and public service, beyond the department.**

Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

None

IV. Resource Availability & Development: F. Resources for Students in the Program**1. The program has adequate personnel, student help, and service and supplies to serve its undergraduate students.**

Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

Would have liked to see more details for this question

IV. Resource Availability & Development: G. Facilities, Equipment, & Library Holdings

1. The program has adequate facilities, equipment, and technological resources to effectively serve its students.	
Sufficient Evidence	3
Some/Partial Evidence	2
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

1. Whitewater Observatory upgrades will be a future need. Sufficient resources for now, but upgrades to the Whitewater Observatory will create an increased need.

V. Conclusions and Recommendations from the Department or Program

1. Program strengths are discussed.	
Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0
2. Areas of improvement and continued progress are discussed.	
Sufficient Evidence	4
Some/Partial Evidence	1
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0
3. Recommendations and resources are discussed.	
Sufficient Evidence	5
Some/Partial Evidence	0
No/Limited Evidence	0
Not Applicable (explain why in comments below)	0

Comments

- Really did not provided a separate answer for 2, answered it in q3 instead.

VI. Reviewer Conclusions

1. Strengths of the Program

- Service to general education.
 - Partnerships with other UW-W programs such as integrated science and business.
 - Unique dual degree agreement with UW-Madison.
 - Talented faculty who are successful in securing impressive grants.
-
- The program is small but growing, and students get considerable one-on-one attention and ample opportunities to participate in research.
 - Working with students on resumes and using that in advising and to help students understand the value of their courses and other experiences is commendable.
 - The program is using assessment of learning as well as student feedback to review and improve the curriculum, which provides support for General Education and several other programs on campus.
 - The student progress database sounds fantastic.

- Students receive individualized attention from faculty.
- Students have opportunities to learn outside of the classroom.
- The Innovation Center provides an opportunity for learning and development of knowledge in the field.
- There are employers interested in graduates.
- The program supports the mission and objectives of the University.
- Faculty are active and successful in securing grants.

Students are involved in research and present at the Undergraduate Research Days.

- Program offers a lot of variety given a limited number of faculty and small size of the program.
- Program has managed to maintain and grow (though not by a lot) over somewhat challenging last few years.
- Faculty are active in research and they understand the importance of involving students in UG research.

2. Areas for Work or Improvement

- Find strategies to identify majors earlier in their college careers, so they can graduate in four years.
-

- Working toward a systematic way of tracking alumni (like most programs on campus).
 - Reconstituting an advisory council, and perhaps using information from that to help promote the major.
 - The program wants to improve outreach to schools and partnerships with area employers.
 - Obtaining funding for renovation of the observatory may be a challenge.
 - The merger with Rock County and determining the future of its agreement with UW Platteville may be a challenge.
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- Students should perform better in comparison to the national average on the Major Field Test.
 - Students should take Math courses earlier on.
 - More needs to be done for outreach, particularly with respect to the development of relationships with High Schools.
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- Department should look at additional avenues for growth, by means such as outreach to schools, offering more computational courses/programs.
- Alumni outreach also needs work.
- Assessment does not really look at how introductory/intermediate courses meet program objectives, some work needs to be done in this regard.

3. Other comments/questions

I have enjoyed the Observatory Lecture Series, but it doesn't get the same press as the L&S lecture series or the Fairhaven lecture series.

4. Recommended Actions

1. Continue the efforts to develop stronger connections with the region, including schools (for recruitment) and industry (for internships and jobs).
2. Work with the college to identify resources needed going forward as enrollments increase.
3. Assessment: Continue the good work you are doing to assess student learning using both internal and external, direct and indirect assessments.
 - a. Develop and implement rubrics for the student work embedded within courses, including gathering interrater agreement on small samples of student work.
 - b. Complete and implement development of a rubric to assess student resumes, and summarize what you learn from these documents.
 - c. Continue to develop a more formal system for tracking graduates, making use of college and university offices and processes as needed.

5. Recommended Result*

Continuation without qualification	X*
Continuation with minor concerns. Progress report may be required, at the discretion of the review team.	
Continuation with major concerns in one or more of the four areas; submit annual progress report to the College Dean & Associate Vice Chancellor for Academic Affairs on progress addressing the major concerns	
Withhold recommendation for continuation, place on probation, and require another complete Audit & Review self-study within 1-3 years, at the Committee's discretion.	
Withhold recommendation for continuation, place on probation, recommend placing in receivership within the college, and require another complete Audit & Review self-study within 1-3 years at the Committee's discretion.	
Non-continuation of the program.	
Insufficient Information in the self-study to make a determination; revise self-study & resubmit.	

*Because the recommended result of this review is to continue without qualification, the program’s next full self-study will be a “short” one focused on the recommended actions from the current report. This short self-study is due **October 1, 2022 to the Dean of the College of Letters & Sciences and November 1, 2022 to the chair of Audit & Review Committee.**