Q1.1. BOG Program Review Self-Study Form AY 23-24
Program Overview
Q1.2. Degree Designation
(Example: AA, BA, MS, PhD)
MS & PhD
Q1.3. Program Title
Example: Chemistry, Art and Design, or Business Administration
See <u>CIM Programs</u> for all official program titles.
MS Biology and PhD Biology
Q1.4. List all associated program majors (For example: BS Design and Merchandising majors are: Fashion Dress and Merchandising, Design Studies, and Interior Architecture)
Biology
Q1.5. College or School
College of Applied Human Sciences
Chambers College of Business and Economics
College of Creative Arts
○ College of Law
O Davis College of Agriculture, Natural Resources, and Design

Eberly College of Arts and Sciences

 Intercollegiate Programs 	
Reed College of Media	
 School of Dentistry 	
School of Medicine	
School of Nursing	
School of Pharmacy	
 School of Public Health 	
O Statler College of Engineering and	Mineral Resources
○ WVU Keyser - Potomac State Colle	ege
 WVU IT College of Business, Huma 	anities, and Social Sciences
 WVU IT College of Engineering and 	d Sciences
Q1.6. Name of the person comp	pleting the self-study
Name	Andrew Dacks
	eview process, department/division chairs are routinely copied on ew results. Please provide the name of the department/division chair (even ing the self-study).
Name	Jennifer Hawkins
Name	
<i>Q2.1.</i> Specialized Accreditation	
Q2.2. Is the program accredited	or included in the accreditation of its college or school?
○ Yes	
No	
Q2.3. Is there a national accred	iting body for programs of this type?
○ Yes	
No	
Q2.4. Does the program plan to	seek specialized accreditation?
<i>Q2.4.</i> Does the program plan to If so, explain the timeline to ach	

If not, explain why the program has decided not to seek specialized accreditation.

Q2.5. Name of the accrediting body

This question was not displayed to the respondent.

Q2.6. Date and outcome of most recent accreditation review/visit

This question was not displayed to the respondent.

Q2.7. Date(s) and outcome(s) of any follow up actions from most recent accreditation visit (interim reviews, reports, monitoring, visits, etc.) *If there have been none, leave blank.

This question was not displayed to the respondent.

Q2.8. Date or approximate date of next accreditation review

This question was not displayed to the respondent.

Q2.9. Attach the most recent comprehensive institutional self-study conducted in compliance with the accreditation or approval process.

This question was not displayed to the respondent.

Q2.10. Attach the accrediting agency's accreditation letter or any other relevant correspondence or interim reports.

This question was not displayed to the respondent.

Q3.1.

Program Mission

Responses in this section are limited to 1500 characters or approximately half a single-spaced page.

Q3.2. Explain how the degree program contributes to WVU's mission, vision, and values.

The goals of our graduate program align with WVU's mission, vision, and values in several ways. Research: Our graduate students perform original research which they publish in upper-tier journals and present at domestic and international conferences and their success has been recognized through awards and fellowships. Teaching: Our graduate program offers cutting-edge training experience through dozens of graduate courses covering all areas of biology. Research skills and professional development are covered comprehensively by our structured curriculum. Furthermore, our graduate students obtain programmatic pedagogical training by contributing to the department's mission as Teaching Assistants. Community: Our graduate program trains the leaders of tomorrow in a wide range of career paths. Our graduate students pursue careers in research fields of strategic importance, and as health practitioners, government or NGO employees, educators, administrators, and policymakers. Their research benefits our community such as via wastewater monitoring of COVID-19 and our genomics core. Our outreach events allow graduate students to share their research/knowledge with the public. Inclusivity: The Biology Department has implemented proactive measures to reach diverse groups of students, enhanced several classes with a focus on inclusive teaching and is committed to continuing its efforts to train a diverse workforce.

Q3.3. Provide either a link to the published mission statement or a brief but specific mission for the program.

The mission of our graduate program is to prepare the next generation of scientists for a wide range of careers by providing in-depth training in biological research, scientific skills, and work ethics.
Q4.1. This section is specific to new programs going through their first Board of Governors' program review.
Q4.2. Is this the program's first Board of Governors' program review?
Yes● No
Q4.3. Provide the target enrollment that the program had identified it would achieve by the end of its third year of operation when it was approved.
This can be found in the CIM Intent to Plan for the program in the History section. If you need assistance with finding this contact Lou Slimak (louis.slimak@mail.wvu.edu) or Robynn Shannon (robynn.shannon@mail.wvu.edu) for assistance.
This question was not displayed to the respondent.
Q4.4. Has the program hired all the new staff (faculty and/or administrative staff) that were proposed during the approval process?
This can be found in the CIM Intent to Plan for the program in the History section. If you need assistance with finding this contact Lou Slimak (louis.slimak@mail.wvu.edu) or Robynn Shannon (robynn.shannon@mail.wvu.edu) for assistance.
This question was not displayed to the respondent.
Q4.5. Why not? Does this impact the program's ability to function as planned?
This question was not displayed to the respondent.
Q4.6. Is this program is a graduate or professional program?
This question was not displayed to the respondent.
Q4.7. Has the program realized projected research and external support expected / projected at the time of approval?

Q5.2. Is this program offered in collaboration with WVU Online?		
YesNo		
	the opportunity to participate in a "F e the actions the program has taken	aculty Needs Assessment" for online as a result of the final report.
This question was not displayed to the re	espondent.	
Q5.4. Provide the final report fro	m WVU Online for the Faculty Needs	s Assessment.
This question was not displayed to the re	espondent.	
<i>Q6.1.</i> Program Resources		
The purpose of this section is to ensure the accessibility and adequacy of the program's infrastructure and resources. The Undergraduate and Graduate Councils do not have the authority to request new funding for facilities or equipment. Q6.2. Has the program experienced significant issues with any of the following during the review period? By "significant," we mean issues that interfere with either the program's ability to be delivered to its students or the students' ability to complete the program in a timely manner.		
Providing students with	Yes	No No
Ability to schedule required	0	
classrooms Access to adequate technological infrastructure	0	•
Access to adequate technological support	0	
Access to adequate physical infrastructure (labs, performance spaces, etc.)	\circ	
Q6.3. Describe the issues the pr	rogram has faced in the area(s) ident	tified above.
This question was not displayed to the re	espondent.	
<i>Q7.1.</i> Faculty Composition and Produc	ctivity	

Q5.1. This section is specific to programs offered in collaboration with WVU Online.

Responses in this section are limited to 2500 characters (approximately 3/4 of a single-spaced page). Responses should be concise but also specific and supported by evidence.

Q7.2. Does the program have the adequate number of faculty necessary to meet the mission of the program?
Yes
○ No
Q7.3. How is the program addressing faculty inadequacy?
This question was not displayed to the respondent.
Q7.4. Has anything happened during the review period that has had significant negative effects on the faculty's ability to be productive in terms of their teaching, research, and service?
Yes
○ No
Q7.5. Provide an explanation of what happened that negatively impacted the faculty's ability to be productive in teaching, research, and/or service, and what steps the program has taken to address these issues.
The Pandemic and the Academic Transformation process negatively impacted our teaching, research, and service missions. The pandemic halted experiments, significantly setting projects back by interrupting processes that were in-progress. There was a toll on the socio-emotional wellbeing and mental health of all the members of our department. Instruction was shifted on-line requiring significant curriculum development with little opportunity for beta-testing. This was exacerbated for faculty with school-aged children due to lack of access to childcare and repeated classroom closures. The pandemic also paused outreach activities. Academic transformation and the pandemic forced many budgetary restrictions on our department. Restricted access to start-up accounts for pre-tenured faculty greatly hindered student recruitment and the acquisition of equipment, reagents and salary lines required to gather data for grant applications. Overhead accounts have been frozen since 2020 which hamstring development of new research avenues hindering applications for extramural funding. Classroom enrollment was increased and funding for teaching assistants decreased, necessitating the development of new curriculum delivery to accommodate more students with less support. A myriad of additional limitations hampered research capacity including halting of external speakers (to build professional networks and scientific collaborations) or new administrative procedures meant to hinder expenditures. Finally, the shift to centralized service desks created a culture where faculty must continually follow up on requests for tasks to be completed. The Biology Department has performed admirably during what we hope are temporary restrictions. The budget for start-up and overhead funds is now consolidated so that faculty can request access to their own funds, however tenured faculty have agreed to abstain to protect the pretenured faculty. We have transitioned curriculum online and changed course design such that teaching assistants can be respon
Q7.6. Does the program have any faculty who are qualified by other means than their academic credentials (e.g., tested experience in the field) as defined in the

Q7.8. Provide the unit's policy for determining if a faculty member is qualified to teach by way of tested experience.

This question was not displayed to the respondent.

08.1.

Program viability: program cost, program revenue.

Student Success: enrollment, program persistence, student performance, completion, and post-graduate placement.

Responses in this section are limited to 2500 characters (approximately 3/4 of a single-spaced page). Responses should be concise but also specific and supported by evidence.

Q8.2. Provide a brief reflection on any changes to program's **fall enrollment** and **program continuance** over the past cycle.

If enrollment and/or program continuance changes are negative, describe any actions the program will take (or has taken) to address those trends. Be sure to reference the provided data, where relevant.

These data can be found in Academic Performance Solutions (APS) on the "Board of Governors Program Review and Annual Report" dashboard. The "Academic Year" should be set to 2022-23. Be sure to click the "Apply" button once you have set the filters.

If the program does not have any faculty with access to APS, email <u>Lou Slimak</u> or <u>Robynn Shannon</u> to request access.

Admission and enrollment demonstrate long-term stability in our MS and PhD programs. We admitted an average of 4.4 MS and 5.8 PhD students each year (prior review period was 4.0 MS and 6.4PhD). Enrollment in both programs was stable at an average of 14 MS students and 31 PhD students each year. We maintained gender equity (52% of MS and 48% of PhDs were women) and 18% of MS and 21% of PhD students were non-white. During this review period 2 MS students (1 to medical school 1 to pursue another research topic) and 8 PhD students left the program (2 to follow their PhD advisor to a new institution, 4 to pursue another research topic, 2 did not meet their agreed upon laboratory responsibilities). Although our enrollment was stable, several factors hampered recruitment of new students. In addition to the challenges created by the COVID pandemic, limited access to start-up and overhead funds used by faculty to recruit talented students in their area of research and the continued restrictions on their use throughout the academic transformation have diminished our competitiveness. Furthermore, our departmental budget has been reduced, so resources for recruitment have been limited. In the Summer of 2022, we were instructed not to recruit any students unless they would be fully covered on research assistantships and not teaching assistantships. In Spring 2023, these restrictions were lifted, but this impacted the ability of our faculty to plan accordingly. There has been a decrease in international applicants which began in the last review cycle reflecting a nationwide trend due to changes in visa application regulations. Finally, our capacity for graduate students is limited by the number of research active faculty in our department. During the review period 5 graduate faculty left (2 retirements, 2 took positions at other institutions, 1 took an administrative position at WVU). We have hired 4 new graduate faculty, and anticipate they will recruit new students as they develop their lab group. Although our recruitment has remained stable, our near term goal is to expand the size and quality of our applicant pool. In the next review period, we will work with the Graduate Recruitment Coordinator for Eberly College and the Undergraduate Recruitment Coordinator for the Biology Department to develop new strategies for promoting our graduate program across a broader range of schools and to develop new approaches to reach a wider population of potential students.

Q8.3. Please provide a brief reflection on any changes in the **program completion** (graduation) data (number of graduates, graduation rate > 60 credit hours for undergraduate programs) over the past cycle.

If those changes are negative, include what actions, if any, the program will take (or has taken) to address those those changes. Be sure to reference the provided data, where relevant.

These data can be found in Academic Performance Solutions (APS) on the "Board of Governors Program Review and Annual Report" dashboard. The "Academic Year" at the top of the page should be set to 2022-23. Be sure to click the "Apply" button once you have set the filters. The academic year for the "Students Graduating with 4-Years of Earning 60 Institutional Credits" should be reviewed for AYs 2016-17, 2017-18, 2018-19, and 2019-20 and can be adjusted at that particular metric.

If the program does not have any faculty with access to APS, email <u>Lou Slimak</u> or <u>Robynn Shannon</u> to request access.

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y g ft (I b re a n	Our department graduated 40 students during the review period and our time to graduation has remained stable with the prior review period (3.8 vs 4.0 years for MS and 6.2 vs 6.1 years for PhD). We doubled the number of PhD students graduated in this review period (29 vs 14). 17 MS students graduated relative to 13 in the prior period. There are several factors that support our relatively low time to graduation. First, we have a high proportion of funded faculty supporting students on graduate research assistantships, rather than teaching assistantships. Second, in 2022 we created BIOL 681 (Research Project Development) which guides students through writing and presenting their program of study to ensure students complete this initial benchmark within their first year. The average time to completion of the Program of study has dropped from 1.3 years 0.67 years. Furthermore, we have reduced the time until PhD students take their comprehensive exams (from an average of 2.75 to 2.25 years) and their proposal defense (from an average of 4.6 years to 4.0 years). Overall, reducing the time to completion of these benchmarks will contribute to reducing the time to graduation. In the next review cycle, we will focus on increasing the number of PhD students that use their proposal document as an application for extramurally funded graduate fellowships. Students will be encouraged to take proposal writing courses offered at WVU after they have completed their comprehensive exams to incentivize timely proposal defense completion and increase the potential for independent funding.

Q8.4. If there are any courses for which the DFW percentage is higher than 30% for students in the program, provide a brief reflection on student success rates in those courses, including how the program plans to improve student success rates.

These data can be found in Academic Performance Solutions (APS) on the "Board of Governors Program Review and Annual Report" tab. The "Academic Year" should be set to 2022-23. Be sure to click the "Apply" button once you have set the filters.

If the program does not have any faculty with access to APS, email <u>Lou Slimak</u> or <u>Robynn Shannon</u> to request access.

Γ	N/A
	N/A

08.5

Please provide a brief reflection on the accomplishments of the program's students.

Include, for example, creative or research-based endeavors such as conference presentations, publications, grants or prestigious scholarships awarded, recordings, exhibitions, or performances.

This may also include information the program has on students after they have completed the program. Examples may include job placement, acceptance into graduate programs or post-doctoral positions, graduate satisfaction surveys, employer satisfaction surveys, etc.

If this is addressed in the attached accreditation self-study, please indicate the section and page number(s) where that information can be found.

The Department of Biology measures student success within the program based on: 1) performance in course work; 2) rates of Fellowships, grants and GRAships; 3) scientific output (poster/talk presentations at conferences, publications in peer reviewed journals; 4) job placement following graduation. During the 5-year review period, 99% of students (90/91 combined MS and PhD students) maintained satisfactory grades in their course work. However, while we recruited a total of 58 students during this period, 10 left our program; 3 left to pursue other areas of research, 2 students left with their advisor, 2 left for other professional or graduate programs, and 2 left the program without communicating their future plans. We highlight that the total losses represent ~17% of the total incoming students and 10% of the total students in the program, indicating that the Department of Biology is doing well at retaining students. With respect to research productivity, as the overall research profile of the department strengthens, the number of students awarded GRA-ships remains high with ~80% of our students supported on either extramural grants (totaling ~\$2,000,000 for our department) or graduate fellowships. Our students collectively were awarded 61 fellowships and scholarships over the review period. Students are substantially contributing to the research productivity. Over the 5-year period, there were 66 articles published from our department with graduate student coauthors and a total of 112 students were authors on manuscripts, as well as over 100 conference presentations. Finally, with respect to employment, of the 40 total students graduating within the 5-year period of this review, 34 are placed in jobs, with ~90% of those graduates working in their respective fields of study. For example, student placement ranges from professors and instructors at the college level (5), postdoctoral researchers (14), to staff scientists or technicians in academic, industry or government labs (13). The remaining 6 graduates are continuing their education in PhD, MD, DO and other professional programs. These examples establish that the vast bulk of our students are landing excellent career positions in their area of trained expertise.

Q9.1. Assessment

Except where otherwise noted, responses in this section are limited to 2500 characters (approximately 3/4 of a single-spaced page). Responses should be concise but also specific and evidence-based.

Q9.2.

Provide a link to the WVU Catalog page that includes the learning outcomes for the program.

Program learning outcomes should be clear, specific, measurable, and suited to the degree-level. They should reflect what it required of students by the discipline as well as capture what is unique to the program at WVU.

Masters: http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/biology/ms/#learningoutcomestext PhD: http://catalog.wvu.edu/graduate/eberlycollegeofartsandsciences/biology/phd/#learningoutcomestext

Q9.3. When were the student learning outcomes for the program last reviewed and/or revised?

This response is limited to 1000 characters.

The student learning outcomes were last revised in March of 2020 to distinguish expectations for the MS and PhD programs. To summarize, general depth of understanding and degree of conceptual and experimental independence should be greater for PhD student relative to MS students.

Q9.4. When was the program curriculum last reviewed and/or revised? This can be verified by checking the CIM History record for the program: https://futurecatalog.wvu.edu/programadmin/

If the program curriculum was revised during the program review cycle, describe the changes made.

Greater clarification was provided for benchmarks, seminar courses with similar titles were adjusted and credits requirements were aligned catalog and graduate handbook.	between the
Q9.5. What CIP Code is associated with the program? This can be located in the program entry in <u>CIM</u> .	
26.0101	
Q9.6. Provide (by attachment) the program's evidence of student learning assessment from the past review cycle. (Additional evidence files may be added at the end of the survey in Section 9).	N
Evidence of direct assessment of student learning is expected.	
Indirect assessment methods (e.g., surveys, eSEI, exit interviews, alumni surveys) are also encouraged ar may be included but are not required.	nd
If the program's evidence of student learning assessment is included in an attached accreditation self-studence indicate the section and page number(s) where that information can be found.	y,
<u>Direct Assessment Aggregate Data.docx</u> 80.8KB	

application/vnd. openxml formats-office document. word processing ml. document

Q9.7. Provide (by attachment) the program's curriculum map, in the form of a matrix with program learning outcomes on one axis and courses and other applicable learning experiences on the other (in whatever stage of development it is currently in).

If a curriculum map is included in an attached accreditation self-study, please indicate the section and page number(s) where it can be found.

Please contact Lou Slimak or Robynn Shannon if you would like assistance or guidance in the construction of your curriculum map.

<u>Curriculum Map - Biology MS and PhD.pdf</u> 32.3KB

application/pdf

Q9.8.

Provide a brief summary of the most relevant assessment findings from this five-year BOG program review cycle.

Findings should address student learning outcomes (as listed in the catalog).

If assessment findings are described in an attached accreditation self-study, please indicate the section and page number(s) where that information can be found.

Based on our mechanisms for assessment, our students completed their benchmarks (our primary direct assessment of learning outcomes; see attachment) earlier than the last review period, improved from year to year based on their annual evaluation of knowledge, technical skills, and professional competencies, graduated in the same amount of time as the last review period and most students obtained jobs in their field of study. The research findings of our students are published in peer-reviewed journals, presented at conferences, and provided important data demonstrating feasibility for extramural grants obtained by our faculty. Based on the exit survey data (attached), students were overwhelmingly positive about most aspects of their experience in their program. However, a near universal sentiment was the need for greater discussion of career paths outside of academia. In the next review cycle, we will consider mechanisms to expose students to professionals with comparable degrees in occupations outside of academia and the development of graduate internship opportunities. Furthermore, we will continue to take advantage of the quantitative data generated by the annual evaluations. For this report, we only had three years of quantitative data available and could only use data from students present in all three years of evaluation. Once more data has been collected, we will be able to use that information for further programmatic planning. For instance, while there were equal amounts of improvement across most of our criteria, the absolute range of these rankings varied, which will allow us to identify criteria upon which we should focus. We will also explore using the evaluation rubrics for the graduate seminar (BIOL 796) as a means to track individualized improvement over the next cycle. Finally, we will also explore the possibility of requiring all students to take writing courses, however this holds its own challenges as their are many sub-field specific practices and conventions.

Q9.9. Provide a brief summary of how the program has improved over the cycle AND how those changes are related to student learning assessment and/or evaluation of progress towards program goals.

This reflection should be supported by evidence collected through assessment and evaluation practices and attached to this program review self-study.

Areas that may be addressed may include changes to: courses, curriculum, learning outcomes, assessment plans, program goals, etc.

If program improvement is addressed in an attached accreditation self-study, please indicate the section and page number(s) where that information can be found.

Our critical metrics (time to degree, enrollment, graduation rate, job placement and research productivity) have remained stable and positive over this review period. Annual evaluations demonstrate that our students make steady progress in conceptual, technical and professional skillsets. Overall, the courses, curriculum, learning outcomes and program goals remained the same. There was a small adjustment in the curriculum to harmonize credits required in our handbook with the those listed in the university catalog, but these were minor (departmental colloquium and graduate seminar). Our greatest area of improvement was the creation of programmatic mechanisms to increase transparency and alignment of expectations between advisors and students. While the impact of these changes is difficult to assess quantitatively, these are important preventative measures that ensure equity for students and faculty. To align expectations, we required research advisors to generate a "Lab Procedures Handbook" stating expectations such as work hours, data management, authorship and professionalism. We required students and advisors generate a signed BIOL 797 (Research) workload plan each semester to define the progress deemed "Satisfactory" and identify any additional resources required. This sets mutual expectations for individualized progress each semester (which can be revised mid-semester) and allows documentation should conflict arise. Workload plans also provide documented justification for placing a student on probation if they earn an "Unsatisfactory" and allow the generation of a remediation plan. We developed an annual Individualized Development Plan complementing the annual committee meeting which quantifies progress from year to year. The student and advisor complete a questionnaire that assesses conceptual, technical, and professional competencies. They discuss alignment and misalignment, then draft a summary which is sent to the department and discussed in the annual committee meeting. We altered the format of our annual committee meetings so that the students and advisor individually discuss the student's progress with the committee before the full committee meets to discuss scientific progress and plans for the upcoming year. A summary is sent to the Grad Chair by a member of the committee (not the advisor). Finally, we developed an on-site advisor policy for students whose primary faculty advisor has left WVU, while the student remains enrolled.

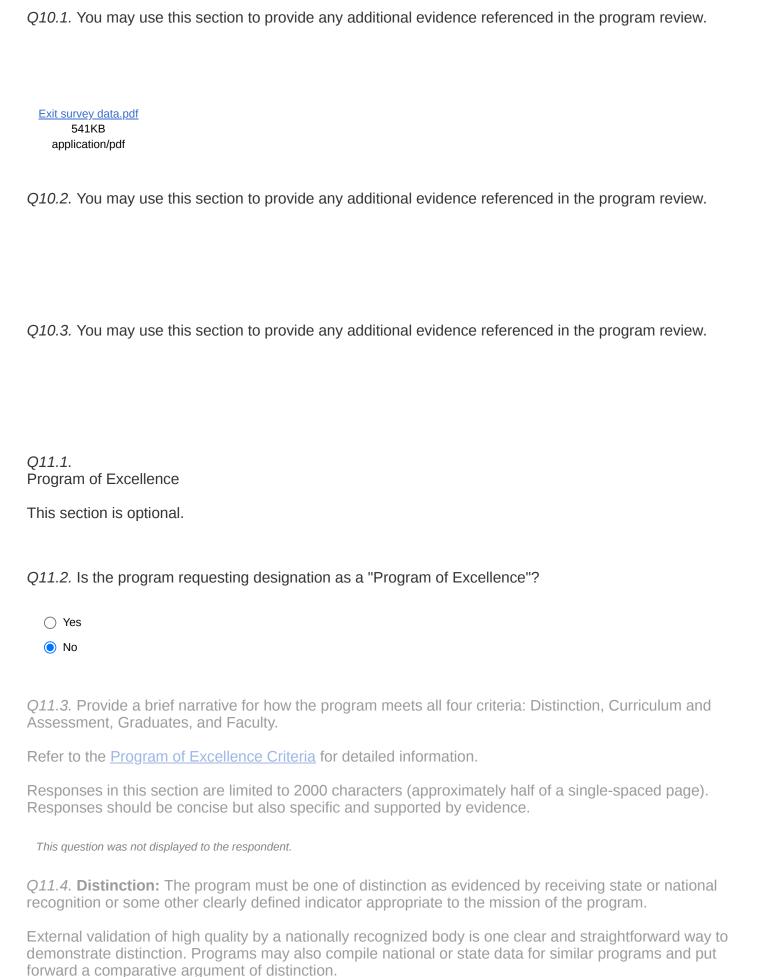
Q9.10. Please provide a response to the market and forecast occupation demand data and analyses for the program in the JobsEQ reports that were provided to you (Education Report and USA Awards report for the CIP code associated with the program). Your response should reference the competitive market for the program (what other institutions have programs most likely to be in competition with this program) as well as the forecast occupation demand.

Please contact Robynn Shannon if you have questions about the JobsEQ reports. Forecast occupation demand data in the JobsEQ Education Report may be supplemented by data from other sources if relevant.

USA Awards/CIP data for 2020-2021 indicates we graduated comparable numbers of MS and PhD students relative to other Big 12 schools (3 MS and 5 PhD WVU, relative to an average of 4 MS and 2 PhD at other Big 12 schools). Compared to schools with 20-30,000 total enrollment (average 10 MS and 3 PhD), we graduated fewer MS students, which reflects the inclusion of course-based MS degrees which typically enroll more students than thesis-based MS degrees. As stated above, 34 of the 40 students that graduated during the review period are currently employed (~90% of those are employed directly in their graduate field of research) and the remaining 6 students are continuing their education by obtaining additional degrees.
9.11. If the program engages with external stakeholders, provide a brief description (e.g. an advisory buncil, outreach to prospective employers, etc.).
ou may skip this question and provide this information by attachment in the next question if it exists in ocumented form.

Q9.12. Provide documentation of how the program engages with external stakeholders (e.g. an advisory council, outreach to prospective employers, etc.).

If this does not exist as a formal document then this question may be skipped.



Q11.5. **Curriculum and Assessment:** The program must have clearly defined learning outcomes and program goals and must regularly assess its student learning outcomes and evaluate its progress towards meeting its program goals. Evidence of a strong assessment plan that utilizes assessment data to improve the program must be included.

The program should hold national or specialized accreditation if available and all accreditation criteria must be met fully.

This question was not displayed to the respondent.

Q11.6. **Graduates:** Evidence of success of graduates in career placement and/or in continuing graduate or professional education must be documented.

This question was not displayed to the respondent.

Q11.7. **Faculty.** Faculty should hold terminal degrees or have equivalent professional experience. For faculty who teach in certificate or Associate's programs, alternative credentials such as work experience in the teaching field may be appropriate.

There should be documented evidence of faculty achievement and scholarly activity.

Evidence of innovation in instruction should also be included if appropriate.

This question was not displayed to the respondent.

Q12.1.

Thank you for completing your West Virginia University Board of Governors program review self-study. You may now submit the survey and your BOG program review will be passed on to the Undergraduate or Graduate Council.

