

# **B.S. Cyber Security**

## **Oregon Tech Assessment Report**

### **2020-21**

#### **Program Description and History**

The Cyber Security degree was launched in the fall of 2020 at Oregon Tech. This degree is offered in Klamath Falls and Wilsonville. The Cyber Security program was recognized as one of the programs offered in Oregon Tech's Management department by accreditation by the International Assembly of Collegiate Business Educators (IACBE).

#### **Program Highlights**

##### **Program Enrollment, Graduation and Employment Rates**

Total enrollment across all campuses is approximately 97 students; 44 at the Klamath Falls campus and 53 in Wilsonville. The program graduated 10 students for 2021. The three-year annual starting salaries averaged \$55,000 (*based on IT graduate data*). The program has a 92% success rate (within six months of graduation students are employed or in graduate school).

##### **Industry Relationships**

Industry relationships for the Information Technology degree program in the 2020-21 assessment period increased in both depth and breadth. These relationships translate into internships, senior project opportunities, and job offers after graduation. The growing list of industry partners that demonstrate interest in Information Technology students and graduating seniors (Nike, State of Oregon, City of Portland Oregon, Intel, Raytheon, Veterans Administration, Wells Fargo, Amazon, and Adidas to name a few) represents tremendous potential for students to engage with industry now and in the future.

##### **Student Learning Experiences**

Oregon Tech and the Business Management department provides many hands-on learning opportunities for students. These are embedded in the courses students take, through internship opportunities, and throughout the year-long senior project. Moreover, the IT curriculum exposes students to technology used by employers. Therefore, graduates of the program leave Oregon Tech with a business and technology toolbox that is relevant in the market with employers. Additionally, the Senior Project Symposium provides students with the opportunity to present their projects in a formal environment to peers, faculty, industry sponsors, and the community at large.

The following are examples of student learning experiences in Information Technology:

- Cyber security solutions integrated into senior project capstone projects
- Oregon's Wild Harvest
  - “The sponsoring organization for this project is a privately-owned herbal supplement manufacturing company, based out of Redmond Oregon. This company's name is Oregon's wild harvest. The project proposed by Esteban Quiles is cyber security in nature, and includes a proposal to perform the following:
    - Vulnerability assessment and results analysis.
    - Network penetration test, and results analysis.
    - Cyber risk assessment.
    - Security plan.
    - Cloud migration plan.”
- Market Intelligence Report for Liberty Natural Products Inc.

The “Migrate, Update and Analyze” project will consist of extracting and migrating marketing data from their old database system called Advanced Revelation to a new and supported database system that is much more common: Microsoft SQL Server. After the migration and thorough testing of the new database, the client requested that an analytics project be undertaken so that the business can better understand where they should put their money in terms of marketing and increasing the return on investment in that aspect. This will be done via collected meta data and measurement of the effectiveness of email, social media or other web marketing efforts.

- Asset and Configuration Management for the City of Portland:  
“The City of Portland employs over 5000 employees and with that many employees, there is a great need for technology to work smoothly. To manage all technology needs, the city created the Bureau of Technology Services (BTS). This bureau is responsible for all the design, testing, implementation, purchasing, and support of any city information technology. While this bureau has many teams devoted to all aspects of I.T., this project will focus on the asset and configuration management processes.”
- Improving Surveillance, Wi-fi Coverage and Device Management for Corbett School District

### **Success Stories**

In addition to their 97% success rate, Information Technology students speak highly of the courses they take as evidenced by course evaluations, many students also derive tremendous value from their internships and senior projects. Below are two such experiences shared by students via email over this assessment period.

- Internships at NIKE and Alaska Airlines has moved to a full-time position with a consulting group where his clients are two NW fortune 500 companies.
- "Oregon Tech's Information Technology program has allowed me to take flight in industry (literally!). With a combination of hands-on learning and supportive staff, I feel like I can accomplish anything."

### **Program Purpose**

#### **Bachelor of Science in Cyber Security Mission**

The B.S. in Cybersecurity is designed to produce graduates that will be ready to enter the workforce as entry-level cybersecurity practitioners, analysts, and penetration testers. Students will be exposed to the fundamentals of computer organization and architecture, operation systems, network routing and switching, and database management, along with specialized courses in cyber defense operations, vulnerability scanning and reporting, cyber incident response, and information system risk management.

### **Educational Objectives**

The Bachelor of Cybersecurity degree objectives is to:

1. Provide students with the knowledge and skills necessary to competently scan, assess, report, and mitigate cybersecurity threats, vulnerabilities, and exploits on information systems and technology.
2. Meet business learning outcomes.
3. Meet the cybersecurity core outcomes.

### **Management Department Intended Student Learning Outcomes (ISLOs)**

The Business - Management option consists of the six core Management Department student learning outcomes. Upon completion of this program, Business Management graduates will be able to:

1. Apply core concepts in a business environment.

2. Apply the legal, ethical, social, and economic environments of business in a global context.
3. Contribute to the development of a team-oriented and collaborative environment.
4. Solve business problems using decision-support tools and /or research skills.
5. Demonstrate professional communication and behavior using a variety of delivery methods.
6. Analyze business concepts and apply strategic planning skills to effect change in an integrated manner.

**Program Student Learning Outcomes (PSLO)**

Upon completion of this program, Cybersecurity graduates will be able to:

1. Describe the tactics, techniques, and procedures used throughout the vulnerability assessment process.
2. Evaluate risk in information systems and apply mitigation techniques to reduce the impact on business operations.
3. Perform information system vulnerability scanning and report findings.
4. Identify information system exploits and apply proper incident response.

**Assessment Cycle**

The Management Department assesses student learning at three levels: at the institutional level, at the department level, and at the program level. Essential student learning outcomes (ESLOs) and assessments are directed by Oregon Tech’s Assessment Executive Committee with two to three ESLOs assessed per year. At the department level, the Management Department assesses six intended student learning outcomes (ISLOs) in accordance with IACBE guidelines and KLOs. At the program level each of the Management Department’s programs assesses its established program-specific student learning outcomes (PSLOs). Program faculty review data from all these assessments, in addition to data from the department’s indirect assessments, including a senior exit survey and industry advisory board feedback, when considering changes and improvements to programs.

The Management Department’s 3-year assessment cycle (see Table 1) is designed to produce assessment results that will inform and direct change within the Management Department in a timely manner, as well as support the strategic goals and core values of the institution. The intent of a 3-year cycle is to provide faculty with the time and space needed to thoughtfully analyze student learning outcomes and operational data, identify areas of concern, engage appropriate stakeholders to inform planning and drive action, evaluate improvement activities and their impacts on student learning and operational outcomes, and reflect on both the process and the results within the context of mission fulfillment at both the departmental- and institutional-level.

**Table 1: Assessment Cycle**

<b>Year</b>	<b>IACBE Schedule</b>	<b>Management Department Schedule</b>
2020-2021	<b>Self-Study</b> Annual Notice	Intended Student Learning Outcomes & Intended Operational Outcomes
2021-2022	Annual Notice	Program-Specific Student Learning Outcomes
2022-2023	Annual Notice	Reflection Year: Qualitative Deep-Dive
2023-2024	Annual Notice	Intended Student Learning Outcomes & Intended Operational Outcomes
2024-2025	<b>IQAR</b> <b>Interim Quality Assurance Report</b>	Program-Specific Student Learning Outcomes

	Annual Notice	
2025-2026	Annual Notice	Reflection Year: Qualitative Deep-Dive
2026-2027	Annual Notice	Intended Student Learning Outcomes & Intended Operational Outcomes
2027-2028	Annual Notice	Program-Specific Student Learning Outcomes
2028-2029	<b>Self-Study</b> Annual Notice	Reflection Year: Qualitative Deep-Dive

## Summary of Achievement of Department’s Intended Student Learning Outcomes

**Table 2: Department’s Intended Student Learning Outcomes**

Intended Student Learning Outcomes (ISLOs)		Learning Assessment Measures		
Department ISLOs		Direct Measures of Student Learning		Indirect Measures of Student Learning
		Senior Project Experience	Strategic Capstone Essay	Senior Exit Survey
Measure		Goal: 80% Scale 1-4, 80% achieve rating of 3 or 4	Goal: 80% Scale 1-4, 80% achieve rating of 3 or 4	Goal: 80% Scale 1-6: 80% rating of 4, 5, 6
<b>1</b>	Apply core concepts in a business environment.	<b>Met 82%</b>		<b>Met 95%</b>
<b>2</b>	Apply the legal, ethical, social and economic environments of business in a global context.		<b>Met 91%</b>	<b>Met 92%</b>
<b>3</b>	Contribute to the development of a team-oriented and collaborative environment.	<b>Met 86%</b>		<b>Met 92%</b>
<b>4</b>	Solve business problems using decision-support tools and/or research skills.	<b>Met 80%</b>		<b>Met 100%</b>
<b>5</b>	Demonstrate professional communication and behavior using a variety of delivery methods.	<b>Met 80%</b>		<b>Met 97%</b>
<b>6</b>	Analyze business concepts and apply strategic planning skills to effect change in an integrated manner.		<b>Met 85%</b>	<b>Met 97%</b>

According to the results presented in Table 2, the Management department successfully met its intended student learning outcomes. The assessments represent a culmination of the student’s educational experience within Oregon Tech’s business programs and have been selected by the business faculty to assess the Management Department’s intended student learning outcomes:

- **Strategic Capstone Essay:** While student outcomes have not changed much over the years, the assessment method used by faculty has continued to evolve. The two faculty that regularly teach this course have worked together to develop more consistent delivery of course content,

assignments, and evaluation rubrics. Moreover, rather than trying to evaluate all ISLOs in the strategic management class, it was determined to focus on two of the ISLOs that more naturally connect to the content of the course. The results have improved from prior years.

- **Senior Project Experience:** The senior project experience is the hallmark of our programs. These are primarily individual, applied projects that require students to utilize project management tools to manage a project for an industry partner with well-defined deliverables. These projects help to launch students into careers of their choosing. The department has continued to review, reflect and improve the processes used to support the successful completion of these projects. While the overall results were positive, a few areas within the assessment fell short of established performance criteria. Specifically, the Summary & Conclusion area scored lower, which includes evidence of a summary with specific recommendations. Also, the rubric criteria of Culminating Experience, which is identified as the student’s ability to adapt and apply skills, theories and methodologies independently in a new situation. These criteria areas provide the department with an opportunity to develop plans for improvement.
- **Senior Exit Survey:** The exit survey was designed to map to our updated ISLOs. The Management department tracks the results of the exit survey every year and has not always met established performance targets. Results from the 2020-2021 administration of the senior exit survey improved from prior years.

## Summary of Achievement of Operational Outcomes

**Table 3: Department’s Intended Operational Outcomes**

Intended Operational Outcomes							
Department IOOs		Operational Assessment Measures					
		Faculty Qualifications	Annual Performance Evaluations	Management Department Retention Dashboard	Career Exit Survey	Management Industry Advisory Council Goal- Semi-Annual Meeting	Senior Exit Survey
Measure:		Goal 100% Academically or professional qualified as defined by IACBE	Goal 80% Professional development and service goals tied to strategic plan	Goal 75% % of student retained after 4 <sup>th</sup> term	Goal 90% % of students to attain employment or admission to grad program	Goal- Semi-Annual Meeting Meeting minutes	Goal 80% Scale 1-6: 80% rating of 4, 5, 6
<b>1</b>	Faculty members will be highly qualified in their disciplines	<b>Met 100%</b> Academically or Professionally Qualified Faculty					<b>Met 90%</b>
<b>2</b>	Faculty engage in professional development and services activities that support the department’s mission		<b>Not Met 50%</b> Professional Development <b>71%</b> Service				
<b>3</b>	Departmental processes support			<b>Semi Met 67.4%</b>			<b>Met 84%</b>

	students throughout their program						
4	Curriculum is current and relevant.				Met 90%	Met 100%	Met 84%

According to the results in the above table we have both met and not met areas of our intended operational goals. While the Management Department has developed a dynamic strategic plan with corresponding action plans, we have not always continuously assessed all of these areas on a regular basis. Our 2020-2021 results provide us with good opportunities for reflection and improvement during the next assessment cycle. The following summarizes these assessments:

- Faculty Qualifications:** Maintaining faculty qualification standards is an area that the department has continued to work on over the last accreditation cycle. The academic business unit has had to grow its part-time adjunct pool to supplement our teaching staff over the last few years due to growing enrollment in our programs. We pay close attention to qualifications of all faculty at the time of hire.
- Annual Faculty Performance Evaluations:** This is a new area of assessment for the Management department, and represents an area where we want to increase standards across the department. Several years ago, we developed a strategic action plan and this intended operational outcome has now been incorporated into the department’s annual assessment process. Moreover, the chair is working with the faculty to increase the level of active (rather than passive) engagement in professional development and service activities.
- Management Department Retention Dashboard:** Over the last two years, the Management department has focused on developing strategies to improve student retention in the department. We have developed a three-pronged approach which relies on common best practices, current resources, and increased communication practices. As such, we have seen a consistent increase in 4th term student retention. However, since both our online and Portland-Metro campuses support more non-traditional students, we are challenged with improving these retention rates. Given this reality, the department is not as focused on its overall retention rate, but is instead focusing on formalizing retention practices to support student success. To this end, Management faculty have developed an early alert system, implemented a strategic communication strategy, engaged with the university- and college-level retention committees, and plan to draft a retention strategy by the end of the 2021-2022 academic year.
- Career Services Exit Survey:** We have regularly reviewed the Career Services Exit Survey for all programs. This survey focuses on graduate job placement and graduate school rates. Overall, the department has had positive results that support both the department’s mission and that of the university.
- Management Industry Advisory Council:** Over the last seven year cycle, we disbanded and then reimaged and launched a new advisory council. Previously, our council included mostly Klamath Falls representatives with few direct connections to industries that represent career pathways of our graduates. The new advisory council was developed through a more thoughtful process that includes industry and alumni representatives that have more direct insight regarding the needs of industry.
- Senior Exit Survey:** Similar to the Career Services Exit Survey, the Management Department annually reviews the Senior Exit Survey for all programs. Survey results have improved over time.

## Summary of Changes, Actions & Outcomes

Table 4 summarizes the Management Department's action plans based on the intended student learning and operational outcomes summarized above. This action plan will be incorporated into our work over the next three year cycle.

**Table 4: Summary of Changes, Actions, and Outcomes**

Change or Improvement Needed	Action Required and Timeline	Desired/Realized Outcomes	Additional Action Required
<p>1. <b>Senior Project Expectations:</b> Continue to align Senior Project expectations and deliverables across all programs.</p> <p>Focus on student performance as related to Culminating Experience and Written and Oral Communication</p>	<p>Annual meeting of senior project faculty to discuss areas of alignment and best practices. Review rubric to create agreement on expectations. Continue to review senior exit survey questions to ensure alignment with outcomes.</p> <p>Continue to work with students to manage scope of their projects and pathways to completion. Consider incorporating student reflection to better understand student perception of their learning experience.</p>	<p>Continue to align expectations for senior project experience across department and programs.</p> <p>Improvements in minimum acceptable performance for these performance criteria. Better alignment between direct and indirect measures of assessment.</p>	<p>Share with the rest of the department to create an overall understanding of measures and outcomes</p>
<p>2. <b>Assessment Cycle:</b> Implement 3-year assessment cycle to promote meaningful reflection and action plans for continuous improvement.</p>	<p>Starting in the fall of 2020, the academic business unit began to implement its new assessment cycle. Ongoing action will require adhering to the new 3-year cycle and reviewing its usefulness moving forward. The academic business unit will focus on assessment of program-specific student learning outcomes in 2021-2022.</p>	<p>New assessment cycle allows for deeper and richer reflection to support continuous improvement on ISLOs, IOOs &amp; broad-based goals to attain mission fulfillment.</p>	<p>Inform/Collaborate with the new AVP of Academic Excellence during implementation of the new assessment cycle.</p>
<p>3. <b>Retention:</b> Continue to develop and implement retention initiatives within the academic business unit to improve retention rates.</p>	<p>2021-2022- Pilot new communication tool which allows faculty/advisors to better monitor student activity. Pilot early alert system, enabling advisors to track student Canvas access as well as current grades.</p> <p>2022-2023-Fully implement communication tool and early alert system across the department in conjunction with university- and</p>	<p>Improve retention of management students across all locations.</p>	<p>Work with newly hired staff within the retention office to determine best practices and available resources.</p>

		college-level retention committee initiatives .		
4.	<b>Faculty Resources:</b> Build faculty resources to maintain course offerings.	Hire full-time faculty needed to fully support current programs. Continue to build pool of part-time faculty to teach in all areas, at all campuses. Determine how to best support part time faculty as well as maintain quality of programs.	Successfully hire requested full-time faculty that meet academic or professional standards. Create a robust pool of part-time faculty. Maintain quality standards and consistent student outcomes across courses and locations.	
5.	<b>Full-time Faculty Engagement and Expectations:</b> Continue to develop consistent professional development and service expectations for full-time business faculty that also support disciplinary differences and individual faculty goals.	Over the next two years, the department chair will work with individual faculty to communicate expectations, in accordance with the CBA, to ensure faculty expectations are well understood. Continue the process of annually updating the department’s strategic action plans and have each faculty member “sign up” to support one or more strategic initiative(s).	Consistent level of performance expectations for faculty in the area of professional development and service across the department.	
6.	<b>Industry Advisory Council:</b> Continue to develop a robust advisory council that can actively support the academic business unit and make connections to industry.	Build advisory council membership including defining roles and responsibilities of advisory council officers and members. Solicit quarterly input in the development of industry relevant program outcomes and curriculum alignment.	Develop robust advisory council that actively supports academic business unit.	

### Program Student Learning Outcomes

Program student learning outcomes were not measured during the 2020-21 academic year.