## ASSESSMENT REPORT TEMPLATE  
\*\*PHD in Computer Science and Software Engineering\*\*   
  
\*\*Student Learning Outcomes\*\*  
Specificity of Outcomes   
\* Students will be able to \*\*apply\*\* appropriate knowledge, theories, and skills to solve complex computing problems.   
\* Students will be able to \*\*design and conduct\*\* research or creative projects by applying principles of computer science.  
\* Students will be able to \*\*communicate\*\* research or project results effectively in written and oral form to both technical and non-technical audiences.   
\* Students will be able to \*\*analyze\*\* the impact of computing on individuals, organizations, and society, including ethical, social, legal, and professional issues.   
  
Comprehensive Outcomes  
The current list of Student Learning Outcomes (SLOs) for the PHD in Computer Science and Software Engineering program is comprehensive. These SLOs were carefully developed and refined by faculty over the years and are aligned with the program's mission to produce graduates equipped to tackle intricate computing challenges, conduct impactful research, and contribute meaningfully to the field.  
  
Communicating Student Learning Outcomes  
The student learning outcomes are communicated through multiple avenues. They are:  
\* Integrated into the course syllabi of relevant courses within the program.  
\* Discussed during new student orientation to provide incoming students with a clear understanding of program expectations.  
\* Regularly revisited during faculty meetings to ensure alignment with curriculum and instruction.  
  
\*\*Curriculum Map\*\*  
A curriculum map visually representing the alignment between program student learning outcomes and required courses/experiences is provided below:  
  
| Courses | SLO1 | SLO2 | SLO3 | SLO4 |  
|-------------------------------------------------|------|------|------|------|  
| 6000 Web Application Development | 0.00 | 1.00 | 0.00 | 1.00 |  
| 6120 Database Systems I (Fall/Spring) | 1.00 | 1.00 | 0.33 | 0.66 |  
| 6130 Data Mining | 1.00 | 0.33 | 0.66 | 1.00 |  
| 6210 Compiler Construction | 0.66 | 1.00 | 0.33 | 0.66 |  
| 6320 Design and Analysis of Computer Networks | 0.66 | 0.66 | 1.00 | 0.00 |  
  
\*\*Measurement\*\*  
Outcome-Measure Alignment   
The assessment of student learning outcomes is primarily conducted through a combination of direct and indirect measures woven into the curriculum. These measures include:  
  
\* \*\*Course-embedded assessments:\*\* In addition to traditional exams and quizzes, many courses require projects, presentations, and case study analyses designed to assess the practical application of theoretical knowledge.   
\* \*\*Qualtrics Surveys:\*\* Standardized surveys are administered to students enrolled in COMP 7990/8990 (Research and Thesis) at different points in their academic journey to gauge their self-perceived proficiency in each of the SLOs.   
\* \*\*Dissertation Defense:\*\* The culminating experience for PHD students, the dissertation defense, serves as a direct measure of a student's ability to conduct original research, analyze data, and communicate findings convincingly.   
  
Direct Measures  
\* Course-specific assignments and projects, evaluated using rubrics aligned with specific SLOs, serve as direct measures.  
\* Qualtrics survey responses related to specific SLOs are considered direct measures.   
\* The dissertation proposal and defense, assessed by faculty committees, function as direct measures of research competency.   
  
Data Collection Methods  
Assessment data are collected through diverse methods, including:  
\* \*\*Faculty-graded assignments:\*\* Course instructors evaluate student work according to predefined rubrics to maintain consistency and objectivity in assessing student performance against the designated SLOs.  
\* \*\*Qualtrics survey data:\*\* Anonymous survey data are collected electronically via Qualtrics, allowing for efficient analysis of trends and patterns in student self-assessment across the program.  
\* \*\*Dissertation committee evaluations:\*\* Committees comprising program faculty meticulously evaluate dissertation proposals and defenses, providing feedback and assigning scores based on established criteria.  
  
\*\*Results\*\*  
Reporting Results  
The table below presents the grades data for various courses offered in 2028:  
  
| Course\_name | Professor | A | B | C | D | F | Score | Total\_students |  
|-----------------------------------|----------------------|----|----|----|----|----|-------|----------------|  
| COMP 6000 | Marghitu | 4 | 0 | 0 | 0 | 0 | 100,0 | 4 |  
| COMP 6120 | Ku (Spring/Fall) | 5 | 0 | 0 | 0 | 0 | 100,0 | 5 |  
| COMP 6210 | Mulder | 1 | 0 | 0 | 0 | 0 | 100,0 | 1 |  
| COMP 6130 | Zhou | 3 | 0 | 0 | 0 | 0 | 100,0 | 3 |  
| COMP 6320 | Shu | 3 | 2 | 0 | 0 | 0 | 90,0 | 5 |  
| ... | ... | ...| ...| ...| ...| ...| ... | ... |  
| COMP 7990/8990 | Qualtrics Measure 1 | 45 | 13 | 4 | 0 | 0 | 91,5 | 62 |  
| COMP 7990/8990 | Qualtrics Measure 2 | 39 | 18 | 4 | 0 | 0 | 89,3 | 61 |  
| COMP 7990/8990 | Qualtrics Measure 3 | 30 | 28 | 4 | 0 | 0 | 85,5 | 62 |  
| ... | ... | ...| ...| ...| ...| ...| ... | ... |  
| COMP 7990/8990 | Qualtrics Measure 9 | 29 | 29 | 4 | 0 | 0 | 85,1 | 62 |  
  
  
\*\*Interpretation of Results:\*\*  
  
\* \*\*Positive Trends\*\*: Most of the courses exhibit high average scores, indicating satisfactory student performance across the curriculum.   
\* \*\*Areas for Attention\*\*: Some courses, such as COMP 6710 (Software Quality Assurance), have notably lower average scores. This suggests the need to investigate potential factors contributing to this trend and consider adjustments to course content or delivery methods.   
  
\*\*Communicating Results\*\*  
The assessment results and their interpretations are systematically communicated to relevant stakeholders.   
  
\* \*\*Program Faculty:\*\* Results are shared with all program faculty during dedicated meetings. This platform allows for in-depth discussion, collaborative interpretation of findings, and the identification of potential areas for improvement.   
\* \*\*Departmental Leadership:\*\* A summary report is submitted to the department chair to inform curriculum review and resource allocation decisions.  
  
\*\*Final SLO Scores and Ratings\*\*  
  
| SLOs | Score | Ratings |  
|------|-------|------------|  
| SLO1 | 91.9 | Exemplary |  
| SLO2 | 93.4 | Exemplary |  
| SLO3 | 87.5 | Proficient |  
| SLO4 | 54.0 | Needs Improvement |  
  
\*\*Interpretation of SLO Scores\*\*  
  
\* \*\*SLO 1 & 2 (Exemplary):\*\* Students consistently demonstrate exemplary performance in applying knowledge and designing research. This trend suggests the curriculum effectively equips students with a strong foundation in core CSSE principles and research methodologies.  
\* \*\*SLO 3 (Proficient):\*\* While students generally perform well in communicating research results, there is room for improvement. The program will explore targeted interventions to further enhance students' communication skills.  
\* \*\*SLO 4 (Needs Improvement):\*\* The score for SLO 4 ("analyze the impact of computing...") indicates a need for significant improvement. This suggests a disconnect between the curriculum's emphasis on technical skills and a broader understanding of the societal implications of computing.   
  
\*\*Action Plan for 2028\*\*  
  
\*\*SLO 4: Analyze the impact of computing on individuals, organizations, and society, including ethical, social, legal, and professional issues.\*\*  
  
\* \*\*Analysis\*\*: The low performance in SLO4, particularly influenced by low scores in courses like COMP 6710, COMP 6320 and COMP 7500, suggests a need for a more focused approach to incorporating ethical and societal impact discussions within these courses.   
  
\* \*\*Action Plan\*\*:  
 \* \*\*Curriculum Integration\*\*: Integrate modules on ethical and societal considerations of computing into the core curriculum. For instance, COMP 6710 could include case studies analyzing software failures and their ethical ramifications. COMP 6320 can integrate discussions on net neutrality and internet governance. COMP 7500 can dedicate modules to discuss ethical challenges of emerging operating system technologies.  
 \* \*\*Guest Lectures/Workshops:\*\* Organize guest lectures by experts in technology law, ethics, and policy to broaden students' perspectives. Conduct workshops on ethical hacking and responsible AI development.   
 \* \*\*New Elective\*\*: Introduce a new elective course focusing specifically on "Ethics in Computing" or "Technology and Society." This will allow for a more in-depth exploration of these critical issues.  
  
\* \*\*Re-assessment\*\*: In 2029, we will re-evaluate SLO4 performance by analyzing student performance in the revised courses, feedback from guest lectures, and enrollment and performance data from the new elective (if implemented).   
  
\*\*Maintenance and Continuous Improvement Plans for other SLOs:\*\*  
  
\*\*SLO 1 & SLO 2 (Exemplary):\*\*  
\* Continue to monitor student performance and gather feedback through course evaluations and program assessments.  
\* Explore opportunities to incorporate emerging technologies and industry-relevant tools into coursework to keep content current and engaging.   
\* Encourage faculty to participate in professional development opportunities related to innovative teaching methodologies in computer science education.  
  
\*\*SLO 3 (Proficient):\*\*  
\* Integrate more oral and written communication assignments within the core curriculum.   
\* Provide workshops on technical writing, presentation skills, and effective communication strategies tailored to diverse audiences.  
\* Encourage participation in student conferences and research symposia to provide opportunities for presenting research to a wider audience.  
  
This multi-faceted action plan reflects the program's commitment to continuous improvement and its dedication to equipping students with the knowledge, skills, and ethical awareness essential for success in their future careers as computer science professionals.

# Curriculum Map (from SLO Computed - Year 2028)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Courses | SLO1 | SLO2 | SLO3 | SLO4 |
| 6000 Web Application Development | 0,00 | 1,00 | 0,00 | 1,00 |
| 6120 Database Systems I (Fall/Spring) | 1,00 | 1,00 | 0,33 | 0,66 |
| 6130 Data Mining | 1,00 | 0,33 | 0,66 | 1,00 |
| 6210 Compiler Construction | 0,66 | 1,00 | 0,33 | 0,66 |
| 6320 Design and Analysis of Computer Networks | 0,66 | 0,66 | 1,00 | 0,00 |
| 6340 Network Quality Assurance and Simulation | 0,33 | 0,66 | 1,00 | 0,00 |
| 6350 Digital Forensics | 0,33 | 0,00 | 0,00 | 0,00 |
| 6360 Wireless and Mobile Networks | 1,00 | 0,66 | 1,00 | 0,66 |
| 6370 Computer and Network Security | 0,33 | 0,00 | 1,00 | 0,00 |
| 6400 Foundation of Computer Graphics | 0,00 | 0,66 | 1,00 | 0,00 |
| 6520 Network and Operating Sys Admin | 0,00 | 0,00 | 1,00 | 0,00 |
| 6530 Cloud Computing | 0,00 | 1,00 | 0,33 | 0,00 |
| 6600 Artificial Intelligence | 0,66 | 0,00 | 1,00 | 0,00 |
| 6620 User Interface Design and Evaluation | 0,00 | 0,66 | 1,00 | 0,66 |
| 6630 Machine Learning | 0,66 | 0,66 | 0,66 | 0,66 |
| 6660 Intro to Evolutionary Comp | 0,66 | 0,66 | 1,00 | 0,66 |
| 6700 Software Process | 0,00 | 1,00 | 0,00 | 0,00 |
| 6710 Software Quality Assurance | 0,66 | 1,00 | 0,66 | 1,00 |
| 6970 Special Topics: Comp Intel. & Adversarial ML | 0,66 | 0,66 | 1,00 | 0,66 |
| 6970 Special Topics: Game Design for Social Change | 1,00 | 0,33 | 1,00 | 1,00 |
| 6970 Special Topics: Cybersecurity Threats&CounterM | 1,00 | 0,33 | 0,33 | 0,00 |
| 6970 Special Topics: Cyber Physical Systems Security | 0,00 | 0,00 | 0,66 | 0,66 |
| 6970 Special Topics: Computational Biology | 0,00 | 0,66 | 1,00 | 1,00 |
| 6970 Special Topics: Deep Learning | 0,66 | 0,66 | 1,00 | 0,66 |
| 6970 Special Topics: Game Design and Development | 0,66 | 1,00 | 0,33 | 0,00 |
| 6970 Special Topics: Information Retrieval | 0,00 | 0,66 | 0,33 | 0,66 |
| 6830 Cybersecurity Threats and Countermeasures | 1,00 | 0,66 | 1,00 | 0,66 |
| 6970 Special Topics: Software Analytics | 0,00 | 1,00 | 1,00 | 0,66 |
| 6970 Special Topics: iOS Development | 1,00 | 0,66 | 0,00 | 0,66 |
| 6970 Special Topics: Binary Program Analysis | 0,33 | 0,66 | 1,00 | 0,66 |
| 7120 Database Systems II | 0,00 | 0,00 | 1,00 | 1,00 |
| 7270 Advanced Topics in Algorithms | 1,00 | 1,00 | 1,00 | 1,00 |
| 7300 Advanced Computer Architecture | 1,00 | 0,66 | 1,00 | 0,33 |
| 7330 Topics in Parallel and Distributed Computing | 0,00 | 0,66 | 1,00 | 0,33 |
| 7370 Advanced Computer and Network Security | 1,00 | 1,00 | 1,00 | 1,00 |
| 7500 Advanced Topics in Operating Systems | 1,00 | 0,66 | 0,33 | 0,33 |
| 7620 Human Computer Interaction | 0,00 | 0,33 | 1,00 | 0,33 |
| 7700 Software Architecture | 0,00 | 1,00 | 0,00 | 0,00 |
| 7720 Software Re-Engineering | 0,83 | 0,00 | 0,00 | 0,66 |
| 7800 AI for Security | 0,00 | 0,00 | 1,00 | 0,00 |
| 7950 Introduction Graduate Study Computer Science | 0,00 | 0,00 | 0,00 | 0,33 |
| 7970 Natural Language Processing | 0,00 | 0,66 | 0,66 | 1,00 |
| 8930 Directed Study | 0,66 | 0,66 | 1,00 | 1,00 |
| 8990 Research and Thesis, Measure 1 | 1,00 | 0,00 | 0,00 | 0,00 |
| 8990 Research and Thesis, Measure 2 | 0,00 | 0,00 | 1,00 | 0,00 |
| 8990 Research and Thesis, Measure 3 | 0,00 | 0,00 | 1,00 | 0,00 |
| 8990 Research and Thesis, Measure 4 | 0,00 | 0,00 | 1,00 | 0,00 |
| 8990 Research and Thesis, Measure 5 | 0,00 | 0,00 | 0,00 | 1,00 |
| 8990 Research and Thesis, Measure 6 | 0,00 | 0,00 | 0,00 | 1,00 |
| 8990 Research and Thesis, Measure 7 | 0,00 | 0,00 | 1,00 | 0,00 |
| 8990 Research and Thesis, Measure 8 | 0,00 | 0,00 | 0,00 | 1,00 |
| 8990 Research and Thesis, Measure 9 | 0,00 | 0,00 | 0,00 | 1,00 |

# Reporting Results (from Grades - Year 2028)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course\_name | Professor | A | B | C | D | F | Score | Total\_students |
| COMP 6000 | Marghitu | 4 | 0 | 0 | 0 | 0 | 100,0 | 4 |
| COMP 6120 | Ku (Spring/Fall) | 5 | 0 | 0 | 0 | 0 | 100,0 | 5 |
| COMP 6210 | Mulder | 1 | 0 | 0 | 0 | 0 | 100,0 | 1 |
| COMP 6130 | Zhou | 3 | 0 | 0 | 0 | 0 | 100,0 | 3 |
| COMP 6320 | Shu | 3 | 2 | 0 | 0 | 0 | 90,0 | 5 |
| COMP 6350 | Cuneo | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6360 | Lim | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6370 | Springall | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6520 | Umphress (Summer) | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6530 | Sardinas | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6600 | Liu | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6620 | Seals | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6630 | A. Nguyen/Karmaker | 4 | 1 | 0 | 0 | 0 | 95,0 | 5 |
| COMP 6660 | Tauritz | 2 | 1 | 0 | 0 | 0 | 91,7 | 3 |
| COMP 6700 | Umphress | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6710 | Rahman | 0 | 0 | 0 | 1 | 0 | 25,0 | 1 |
| COMP 6970-CTCM | Cuneo | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970-CPS | Yampolskiy | 3 | 0 | 0 | 0 | 0 | 100,0 | 3 |
| COMP 6970-BPA | Mulder | 1 | 0 | 0 | 0 | 0 | 100,0 | 1 |
| COMP 6970-GDSC | Thomas | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 7970-Research EC | Tauritz | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970 | Heaton | 1 | 0 | 0 | 0 | 0 | 100,0 | 1 |
| COMP 6970 | A Nguyen | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970 | Seals | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970-IR | Karmaker | 3 | 0 | 0 | 0 | 0 | 100,0 | 3 |
| COMP 6830 | Springall | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970 | Sardinas | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 6970 iOS | Chapman | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 7270 | Zhou | 17 | 1 | 0 | 0 | 0 | 98,6 | 18 |
| COMP 7300 | Baskiyar | 13 | 10 | 2 | 1 | 0 | 83,7 | 26 |
| COMP 7370 | Shu | 2 | 0 | 0 | 0 | 0 | 100,0 | 2 |
| COMP 7500 | Qin | 13 | 4 | 0 | 0 | 0 | 94,1 | 17 |
| COMP 7620 | Seals | 0 | 0 | 0 | 0 | 0 | 0,0 | 0 |
| COMP 7720 | Yamposkiy | 1 | 1 | 0 | 0 | 0 | 87,5 | 2 |
| COMP 7930/7980/8930 | Qin | 6 | 0 | 0 | 0 | 0 | 100,0 | 6 |
| COMP 7970-NLP | Karmaker | 3 | 0 | 0 | 0 | 0 | 100,0 | 3 |
| COMP 7990/8990 | Qualtrics Measure 1 | 45 | 13 | 4 | 0 | 0 | 91,5 | 62 |
| COMP 7990/8990 | Qualtrics Measure 2 | 39 | 18 | 4 | 0 | 0 | 89,3 | 61 |
| COMP 7990/8990 | Qualtrics Measure 3 | 30 | 28 | 4 | 0 | 0 | 85,5 | 62 |
| COMP 7990/8990 | Qualtrics Measure 4 | 30 | 29 | 3 | 0 | 0 | 85,9 | 62 |
| COMP 7990/8990 | Qualtrics Measure 5 | 33 | 28 | 1 | 0 | 0 | 87,9 | 62 |
| COMP 7990/8990 | Qualtrics Measure 6 | 27 | 33 | 2 | 0 | 0 | 85,1 | 62 |
| COMP 7990/8990 | Qualtrics Measure 7 | 27 | 31 | 4 | 0 | 0 | 84,3 | 62 |
| COMP 7990/8990 | Qualtrics Measure 8 | 30 | 32 | 0 | 0 | 0 | 87,1 | 62 |
| COMP 7990/8990 | Qualtrics Measure 9 | 29 | 29 | 4 | 0 | 0 | 85,1 | 62 |

# Communication Results (from SLO Scores and Ratings - Year 2028)

|  |  |  |
| --- | --- | --- |
| SLOs | Score | Ratings |
| SLO1 | 91,9 | Exemplary |
| SLO2 | 93,4 | Exemplary |
| SLO3 | 87,5 | Proficient |
| SLO4 | 54,0 | Insatisfactory |