ANNUAL PROGRAM REPORT

I.   **SUMMARY OF ASSESSMENT**   *(suggested length of 1-2 pages)*

CS 6320 – Software Engineering of Web-Based Systems, Elective, Developing PLOs 2 and 4
CS 6525 – Network Security, Elective, Developing PLO 2 and Mastering PLO 4

C. **Summary of Assessment Process**

Instrument(s)

in an undergraduate career. Again, most of the graduate students in the Master's in Computer Science program are international students, and many international Computer Science programs do not stress coding skills to the degree that is necessary to become proficient. As a result, many of our Master's students start at a disadvantage in regards to PLO #4. The Department addresses this disadvantage by requiring remediation of basic programming courses for many admitted students, and by emphasizing the need for programming projects in as many Master's degree courses as possible. Under the semester-based system, a new required graduate-level data structures and algorithm analysis has been added to help students get up to speed quickly.

Please also note that all of the courses used to assess PLO #4 are electives, which can lead to selection bias. It may be that students with poorer coding skills chose to take CS 6310 and CS 6320, where the assessment results are mediocre, and students with better skills chose to take CS 6525, where the results are good. It is not clear that the scores assess the program as a whole.   That said, PLO #4 is to be developed in CS 6310 and CS 6320 while it is to be mastered in CS 6525, and the scores do actually reflect a better mastery of coding in CS 6525 than the earlier courses. The Department has again addressed the issue of consistency of assessment under semesters by assessing all PLOs in required classes rather than electives.

In regards to closing the loop and using the results of the assessment process to improve student learning for PLO #4, it would appear that the students in CS 6525 have successfully mastered the PLO and no further modifications are needed. In CS 6310 and 6320, we would like to see improvements in coding proficiency at the development level. As mentioned, the new required course in coding that will be instituted under semesters will be the Department's first attempt to address this issue.

CS 6310:
This elective course in Advanced Software Engineering addresses material which is relatively well-defined, including both theoretical elements as well as significant elements of coding and development practice. It requires advanced understanding of software development issues, practical use of software development tools, and testing and software lifetime management, which is why it particularly addresses PLO #4. There is reasonable latitude available for addressing different areas or additional material, so fine-tuning would be aimed towards identifying subject material which most successfully results in student acquisition of the necessary skills and theory. In addition, as with most classes, it would be beneficial to provide additional learning opportunities for students who were unsuccessfully served by the current class format. These opportunities might include high impact educational practices such as collaborative projects or swapped classrooms.

CS 6320:
This elective course in Software Engineering of Web-Based Systems addresses material which has a well-defined core of material but is constantly being enhanced by new developments and advances in the industry standards.   It clearly maps to PLO #4, in critiquing, planning and producing complex software applications as web systems typically involve many elements, both front-end interfaces and back-end databases, across multiple machines simultaneously.   There is again a fairly wide range of subject areas that could be covered, and actual implementation of systems using standard tools, cloud-based services, industry-standard libraries and frameworks is an essential part of the class. Similarly to CS 6310, closing the loop will entail identifying the theoretical subject areas and software projects that lead to the most successful student learning.

CS 6525:
This elective course in Network Security addresses material which has a relatively well-defined core, but which also includes a constantly changing array of attacks and corresponding applications of security functionality. Both theory and implementation are critical to this subject, with familiarity with industry

under the semester-based system, assessment data from the current PLOs will not provide a meaningful comparison under the new system. The department will begin gathering assessment data regarding the semester-based PLOs beginning in Fall 2018.