

Computer Science Department Instruction 1520

From: Chair, Computer Science Department

Subj: ASSESSMENT PLAN

Encl: (1) Long-Range Assessment Plan

1. Purpose. This instruction updates the Computer Science Department's Assessment Plan.

2. Cancellation. COMPSCIDEPTINST 1520, 16 Aug 2006.

3. Goal. The purpose of conducting regular academic assessment in the department is to facilitate continuous quality improvement. Our assessment activities should provide structure and organization, to support a continuous cycle of evaluation and improvement of our educational program.

4. Organization. The department's Assessment Committee will consist of a Committee Chair plus at least three committee members, all of whom are full-time civilian or military faculty of the department. The Chair of the Assessment Committee will serve as Assessment Coordinator and will have overall responsibility for ensuring that all assessments are completed in a timely manner and will report completion of each assessment to the Department Chair.

5. Accreditation. The department maintains an academic accreditation; the current status can be found on our web site. The Assessment Committee is charged with maintaining the department's accreditation status, and ensuring the department's assessment activities satisfy the guidelines established by ABET's Computing Accreditation Commission (CAC).

6. Regular Activities. The department's regularly-scheduled assessment activities will be conducted on an academic-year basis, and outlined in a tasking memorandum from the department chair. The tasks will normally include, but are not limited to:

a) Conduct and document regular committee meetings.

b) Review the collection plans for each semester's Student Outcome data, with the relevant course coordinators. Ensure course

coordinators are able to correctly enter data into the Student Outcome database.

c) At the end of each semester, conduct a meeting of the Midshipman Advisory Board. Collect feedback from the CS/IT majors on the conduct of the semester. Anonymize and report the results to the full department faculty.

d) At the end of each semester, conduct an assessment-focused department meeting, at which the significant results from the semester are reviewed. The meeting after the Spring semester is the Annual Assessment Review.

e) By the end of the Spring semester, prepare and submit an annual department assessment report, in accordance with USNA guidelines.

f) Near the end of the Spring semester, conduct a Senior Exit Survey of majors in the graduating class. Include the results in the end-of-year assessment review.

g) During the Spring semester, administer the Major Field Test examinations to the 1/c midshipmen in the department's majors. Include the results in the end-of-year assessment review.

h) Periodically throughout the academic year, ensure the department's assessment information is updated on our web pages.

i) At the conclusion of the Spring semester, conduct an Annual Assessment Review. At this review, present the assessment data from the academic year to the department faculty for discussion. Conduct faculty training on assessment. Discuss both the appropriateness, and attainment of, the Student Outcomes and Program Educational Objectives, among all department faculty. The department faculty will specifically:

1. Review the Student Outcomes. Confirm whether they are appropriate to each major as-is, or require modification to support the department's mission. Decide, for each Outcome, whether the current data indicate student attainment or not and, if not, what review and remediation steps are required.

2. Review the Program Educational Objectives (PEOs). Review all feedback received from the program's constituents. Based on this feedback, confirm whether the current PEOs are appropriate or require updating/modification. For each PEO, decide whether current data indicate graduate attainment or not and, if not, what review and remediation steps are required.

The results of the Annual Assessment Review will be documented in writing and retained by the Assessment Committee.

7. Student Outcomes. Student Outcomes define the desired characteristics of graduates of our department's programs. They represent our standards for a student's demonstrated abilities by the time of graduation.

a) Student Outcome Attainment. Student Outcome attainment will be evaluated using data from core courses in the major, i.e., courses taken by all CS or IT students, respectively. Student Outcomes will be analyzed in three-year intervals, since each student spends three years (3/c, 2/c, 1/c) as a CS or IT major. Each group, or cohort, will have its attainment progress tracked as it progresses. This system began with the Class of 2010, continued with the Class of 2013 and, after a 1-year adjustment for synchronization (see long-range plan), will continue with the Class of 2017, and every three years thereafter.

Attainment of each Student Outcome will be measured in at least two core courses in the major, by sampling performance on course Learning Objectives that are explicitly mapped to corresponding Outcomes. This mapping will be reflected in a course's policy document. The matrix mapping Student Outcomes to the courses in which their attainment is measured will be maintained on the department's web [site](#), and kept up to date by the Assessment Committee. Note that this matrix only reflects *measurement* of attainment of the Student Outcomes, which may also be enabled (but not measured) in other courses, internships, and extracurricular activities that comprise the department's academic program. In other words, from the standpoint of enabling the Outcomes, the matrix should be viewed as a minimum. The department will use this matrix, which is a form of sampling, rather than measure every Outcome in every course offering, to obtain representative data without excessive faculty workload in data collection.

When a cohort takes a core course in the major, Student Outcome data is collected. The Assessment Committee is responsible for ensuring course coordinators have an appropriate set of evaluated items chosen for collection. The Assessment Committee will maintain the Student Outcome data in a central database, managed by the Chair. Course coordinators are responsible for defining learning objectives in the database, ensuring the learning objectives are properly mapped to appropriate Student Outcomes, and that data for the evaluated items is collected and entered in the database. At the conclusion of each semester, the Assessment Committee will present updated snapshots of Student Outcome attainment to the department faculty for review.

At the end of the Spring semester, during the Annual Assessment Review, the faculty will consider whether the Student Outcomes are being effectively attained, indicating 'yes' or 'no' for each Outcome, based on the current cohort data. The following guidelines are established for reference, but are not binding:

- Student median (50th percentile) performance below a 75% level suggests lack of attainment.
- Students at the 25th percentile performing below a 60% level suggests lack of attainment.
- A single Student Outcome showing median performance significantly below all other Student Outcomes (more than 10-15% below the next lowest Outcome) suggests lack of attainment.
- A single Student Outcome showing a sharp decline (10-15%) in median performance since the previous cohort suggests lack of attainment.

Instances meeting any of these guidelines will be highlighted for faculty review.

Any time the faculty decides collectively that a Student Outcome is "not being effectively attained," the department will conduct a Student Outcome Review. The Student Outcome Review requires, at a minimum:

- The Assessment Committee and course coordinators will meet and review all the data collected for the Outcome in question.
- The Assessment Committee will advise the Curriculum Committee and individual course coordinators whether it recommends any curricular adjustments.
- The Assessment Committee may recommend additional data collection for the Outcome in question, beyond the standard data collection matrix.
- After completing the Student Outcome Review, the Assessment Committee will report its findings and recommendations in writing to the department chair.

No more than 12 months after any changes are instituted as a result of insufficient Outcome attainment, the Assessment Committee will "close the loop" by reviewing with appropriate faculty the result of the changes, with an emphasis on the use of direct measures.

b) Student Outcome Appropriateness. The department currently directly adopts the Student Outcomes defined by the Computing Accreditation Commission (CAC) of ABET, for both our programs (CS and IT). However, the Outcomes may be changed, through addition by the department, or modification of the core set by the ABET CAC. At least annually, at the end of the academic year, during the Annual Review, the faculty will:

- Note any changes to the standardized Student Outcomes promulgated by the CAC, and decide whether to incorporate them directly into our own.
- Review the department's Student Outcomes collectively, decide whether any revisions are necessary, and if so approve the changes.

c) Continuous Learning. The department's program will enable a Student Outcome related to continuing professional development, but this Outcome will not be assessed using the same data collection methods used for the other Outcomes. The continuous learning Outcome will be enabled through at least two documented lessons in core courses, one in a student's third-class year, the other in either second-class or first-class year. These lessons will comprehensively cover all the continuing academic, personal, and professional development opportunities available to midshipmen while at USNA (but outside the classroom), and after they graduate. The first lesson will focus on the former, the second lesson the latter. Topics will include, but are not limited to: research opportunities, honor societies, professional computing societies, summer internships, service selection options, postgraduate education, electronic resources, and journals and conferences in the computing field. One or both of these lessons will include a written student learning check, the results which will be retained by the Assessment Committee.

8. Program Educational Objectives. Program Educational Objectives (PEOs) are defined as "broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve." The department currently has four PEOs. Our goal is that our students, by approximately five to seven years after graduation, will have:

- PEO 1            Applied skills and problem-solving abilities to solve tactical Navy and Marine Corps problems.
- PEO 2            Communicated effectively, in both oral and written form, about computer technology to both technical and non-technical audiences.
- PEO 3            Practiced the ethical, legal, and social implications of computing consistent with Navy and Marine Corps core values (Honor, Courage and Commitment ).
- PEO 4            Grown through self-study, continuing education and professional development that are relevant to officers and scientists.

a) PEO Attainment. PEO attainment will be measured indirectly through the Alumni Survey, which will be administered according to the long-range plan in enclosure (1). The Alumni Survey targets former students five to seven years after graduation, and invites them to self-assess against the PEOs, based on their own experiences in the fleet since commencement. The Alumni Survey questions pertaining directly to PEO attainment are scored from 1 to 5, with 1 corresponding to "strongly disagree," and 5 corresponding to "strongly agree," where agreement reflects attainment of the PEO.

At the end of the academic year in which the Alumni Survey is conducted, the Assessment Committee Chair will present the results to the department faculty, who will determine whether the Survey data reflect attainment of each PEO. The Assessment Committee Chair will highlight, as a general reference point, those PEOs whose survey questions reflect less than a 3.5 average (on the 1 to 5 scale) in favor of attainment, and any PEOs whose average has declined sharply from the previous Survey. After reviewing the data, the faculty will determine whether each PEO is being effectively attained.

If one or more PEOs are not being effectively attained, the department will conduct a PEO Review. The PEO Review requires, at a minimum:

- The Assessment and Curriculum Committees will examine the program of instruction in the areas supporting the PEO(s) in question, and make written recommendations for improvement to the department chair.

- Any corrective actions adopted will be documented by the Assessment Committee.

b) PEO Appropriateness. There are four main constituencies of the department's programs:

- The operational forces of the military services (the employers of our graduates), primarily the U.S. Navy and the U.S. Marine Corps.

- The schools where our graduates seek advanced education. These primarily include, but are not limited to, the Naval Postgraduate School (NPS), Naval War College, Army War College, Air War College, Armed Forces Institute of Technology, and National Defense University.

- Our students, the midshipmen majoring in the Computer Science Department curricula.

- The Computer Science Department faculty and staff.

There are additional, secondary constituencies, including the Naval Academy Alumni Association, the other DoD and government agencies with whom our graduates may serve (e.g., NSA, DIA, State Department), and ultimately the American taxpayers. These other groups sometimes provide input to the department but, for the purpose of formal assessment, we restrict our list of named constituencies to the principal stakeholders.

The constituencies will be solicited to provide periodic input on the appropriateness and attainment of the PEOs, as follows:

- The operational forces and postgraduate institutions will be invited to provide feedback on PEO attainment by our graduates, as well as PEO appropriateness during Outside Visits, on approximately a six-year interval, alternating with ABET accreditation visits. The Outside Visit Committees will consist of senior representatives from our constituent communities (e.g., senior leaders from the Navy's graduate schools, Information Dominance Corps, and related

communities), and may also include individuals with program assessment experience. These Outside Visits will serve the dual purpose of informal program review, as well as the informal military equivalent of an industrial advisory board.

- Our students will have the opportunity to comment on the appropriateness of our PEOs through the annual senior exit survey.

Our faculty will review the appropriateness of the PEOs at least once per year, during the Annual Assessment Review, considering all constituent input in doing so.

9. Visits. In accordance with maintaining its accreditation, the department will host site visits as needed, at intervals determined by the current accreditation status. In addition, between ABET team visits, the department will invite Outside Visit Committees to perform an assessment review. The current draft plan for these visits is contained in enclosure (1).

10. Documentation. Master documentation for assessment will be maintained on the department's website and faculty-share server. Hard-copy backups will be maintained in the department's records room by our Educational Technician.

The Assessment Committee is charged with regularly reviewing and this instruction for currency and accuracy.

11. Summary. The department is committed to a formal assessment process that facilitates continuous quality improvement in its academic program. This document outlines a basic framework for the department's assessment processes, which should be considered a minimum, and always open to further enrichment. All department faculty are charged with supporting our assessment process.

S. Miner

Enclosure (1) Long-Range Assessment Plan

USNA Middle States	Year	ABET Visit	Outside Visit	MFT	Exit Survey	Student Outcome Cohort	Alumni Survey
	2005			X	X		
	2006		X	X	X		X
	2007	X		X	X		
	2008			X	X	class of 2010	
	2009			X	X		
	2010			X	X		
X	2011			X	X	class of 2013	X
	2012	X		X	X		
	2013			X	X		
	2014			X	X	adjust DB	
Self	2015		X	X	X	class of 2017	
Study	2016			X	X		X
	2017			X	X		
	2018	X		X	X	class of 2020	
	2019			X	X		
	2020			X	X		
X	2021		X	X	X	class of 2023	
	2022			X	X		X
	2023			X	X		
	2024	X		X	X		
	2025			X	X		