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APPENDIX A-1: BS in CS Program Educational Objectives – Effective Fall 2015

<https://abet.cs.fiu.edu/csassessment/bs-cs-program-objectives-outcomes/>

Program Educational Objectives for the BS in CS Program

Graduates of the BS program in Computer Science or Information Technology will

1. Be successful in applying for entry level professional positions in computing-related fields, or for admission to graduate programs.
2. Be prepared for career accomplishment, responsibility and advancement in computing-related professions by virtue of having received in the BS program
 - 2.1. A high-quality technical education in computing,
 - 2.2. Communication and team-work skills,
 - 2.3. Awareness of the ethical and social responsibilities of their profession,
 - 2.4. An ability to engage in continued professional development activities.

APPENDIX A-2: BS in CS *Student Outcomes* – Effective Fall 2015

<https://abet.cs.fiu.edu/csassessment/bs-cs-program-objectives-outcomes/>

Student Outcomes for BS in CS Program

Graduates of the BS program in Computer Science will attain, by the time of graduation

- (a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- (d) An ability to function effectively on teams to accomplish a common goal.
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
- (f) An ability to communicate effectively with a range of audiences.
- (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- (h) Recognition of the need for and an ability to engage in continuing professional development.
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.
- (j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- (k) An ability to apply design and development principles in the construction of software systems of varying complexity.

APPENDIX B-1: BS in CS Assessment Plan

SCHOOL OF COMPUTING AND INFORMATION SCIENCES
ASSESSMENT PLAN
of the
Bachelor of Science in Computer Science Program

I. INTRODUCTION

The document, Assessment Mechanisms and Procedures, of the School of Computing and Information Sciences (SCIS), describes the means by which the School conducts the biennial assessment of its BS in Computer Science program. The instruments employed for assessment, and the SCIS administrative structure for performing the assessment are described in that document. These means include:

- Survey Instruments
 1. Course Outcomes Survey by Students
 2. Course Outcomes Survey by Instructors
 3. Survey of Graduating Students
 4. Survey of Alumni
 5. Survey of IAB members and Employers

- Recommendations from constituents
 1. Industry Advisory Board (IAB)
 2. Women in Engineering and Computer Science (WIECS)
 3. ACM Student Chapter
 4. Students in Technology, Academia, Research, and Service Group (STARS)

- Direct Measures
 1. Senior Project Assessment
 2. Course-Embedded Assessment

The administrative structure for conducting the assessment comprises

- The Undergraduate Program Director (UPD)
- The Assessments Coordinator (AC)
- The Subject Area Coordinators (SACs)

The assessment procedures are performed by the SCIS Subject Area Coordinators and the SCIS Assessments Coordinator. Their findings are reported to the SCIS Undergraduate Committee for evaluation, resulting in a set of recommendations to the SCIS faculty.

This document, the SCIS Assessment Plan, defines the implementation of the entire assessment cycle. It specifies the roles of all participants in the process, and sets out a timetable for execution of those roles.

II. PARTICIPANTS

1) The Undergraduate Program Director (UPD)

The Undergraduate Program Director is appointed by the Director of SCIS. The UPD bears overall responsibility for the administration of all SCIS undergraduate programs.

The role of the UPD relevant to the assessment process is

- To designate the chair of the SCIS Undergraduate Committee (below)
- To ensure that the assessment timetable is followed and that the procedures are otherwise executed as set forth in this document and in the Assessments Mechanisms and Procedures Document
- To document and implement program adjustments arising from the biennial assessment process that are approved by the SCIS faculty and, if necessary College and University Curriculum Committees.

2) The Subject Area Coordinators (SACs)

The Subject Area Coordinators may be appointed by the UPD or elected by the SCIS faculty. In this evaluation cycle, a new Subject Area, Applications, is introduced. Each SAC bears responsibility for a group of courses in the BS in Computer Science curriculum:

Applications (NEW) Subject Area courses:

- CAP 4104, CAP 4453, CAP 4630, CAP 4641, CDA 4625.

Programming Subject Area courses:

- COP-2210, COP-3337, COP-3530, COP-4338, COP-4226, COP-4520.

Software Engineering Subject Area courses:

- CEN-4010, CEN-4021, CEN-4072, CIS-4911, IDS-4918.

Computer Organization Subject Area courses:

- CDA-3103, CDA-4101, CDA-3XXX (coming in spring2020), COP-4610, CNT-4713.

Computer Systems Subject Area courses:

- CAP 4612, CAP-4710, CAP-4770, CEN-4083, COP-4604, COP-4710, COP-4722.

Foundations Subject Area courses:

- MAD-2104, COT-3100, COT-3541, MAD-3512, COP-4555, CAP-4506, COP-4534, COT-4521, Math Electives

Professional Development Subject Area courses:

- CGS-1920, CGS-3095, ENC-3249

Other: MAC 3311, MAC 3312, PHY 2048(L), PHY 2049(L), STA 3033

The above lists will be modified as and when needed to reflect the changing requirements of the Program or addition of new area-specific courses. The UPD and SACs will be responsible to suggest these area-specific modifications.

The role of a Subject Area Coordinator is:

- To maintain a common syllabus for each SCIS course in their area.
- To maintain the instruments and rubrics for course-embedded assessment in their area

- To liaise with the academic unit teaching a non-SCIS course that is a required or elective course in the BS in CS program.
- To interpret the data from the Student and Instructor Course Outcomes surveys for each course in their area.
- To prepare a biennial report presenting the findings from the course surveys, and to make recommendations based on these findings.

3) The Assessments Coordinator (AC)

The Assessments Coordinator is appointed by the SCIS Director. The role of the AC is:

- To interpret the data from the Survey of Graduating Students, Senior Project assessment, and Alumni survey.
- To prepare the SCIS biennial assessment report every odd year (2013-14). The report presents the data from these assessment mechanisms and resulting findings and recommendations, and summarizes the recommendations from SAC reports.
- To monitor the BS in CS program for compliance with the ABET accreditation criteria.
- To prepare the ABET accreditation self-study report, and program documentation as may be required by ABET.

The Assessments Coordinator should not simultaneously be a Subject Area Coordinator, except for the Calculus and Physics area (liaison).

4) The Undergraduate Committee (UGC)

The Undergraduate Committee may be appointed by the SCIS Director or elected by the SCIS faculty. The UGC Chair convenes and conducts all UGC meetings as necessary. The Undergraduate Program Director and Assessments Coordinator are ex-officio members of the Undergraduate Committee.

The UGC has the responsibility of considering proposed changes to the existing SCIS undergraduate courses and programs, and of making recommendations, based on these considerations, to the full SCIS faculty.

The role of the UGC in the assessment process specifically, is to consider the AC's biennial assessment report. Each AC or SAC recommendation contained in the biennial report is evaluated by the UGC. Where helpful, the UGC may require further input or clarification from the author (AC or SAC) of a recommendation. At the conclusion of their deliberations, the UGC chair prepares a summary of recommendations for presentation to the SCIS faculty. In the summary:

- The UGC may endorse an AC or SAC recommendation for adoption by the SCIS faculty.
- The UGC may endorse an AC or SAC recommendation and propose to the SCIS faculty a means of enacting the recommendation.
- The UGC may decline to act on a recommendation, setting forth reasons for its decision.
- The UGC may author its own recommendations to the SCIS faculty.

5) The SCIS Faculty

The SCIS faculty, collectively, has sole responsibility for promulgating and modifying its academic programs. The SCIS faculty approves or rejects any recommendations for adjustments to the BS in Computer Science program. Adoption of SCIS approved program adjustments may be subject to final approval of College and University Curriculum Committees.

III. SCHEDULE

1) Surveys

The schedule for administering Course Outcomes, Graduating Students and Alumni surveys is set out in the SCIS Assessment and Mechanisms document. All surveys are carried out on-line. The SCIS Director for IT and Business Relations has the responsibility of ensuring that the data from any survey is available within one month of conclusion of the survey.

2) Direct Measures Assessment

Senior Projects are presented at the end of every semester. The resulting assessment data are collected by the Senior Project coordinator and are available by the start of the following semester. Data from the course-embedded assessments are prepared by the SAC's and are made available by the start of the next semester.

3) Subject Area Coordinator Biennial Reports

The SAC biennial reports cover the Summer, Fall, and Spring semesters of two previous years. These reports are made available to the Assessments Coordinator by the end of September of every odd year.

4) Recommendations from Constituents

Recommendations from IAB, WIECS, ACM Chapter, or other constituent group are provided to the assessments Coordinator no later than the end of September of every odd year.

5) Assessment Coordinator Biennial Report

The AC biennial report incorporates data and recommendations from all of the sources listed above. The report covers the period of two years (six semesters) and is made available to the Undergraduate Committee by the end of the Fall term of every odd year.

6) Undergraduate Committee Summary of Recommendations

UGC meetings to consider the biennial assessment report are conducted during the first two months of the Spring term of every even year. UGC concludes all deliberations, and the UGC summary of recommendations is made available to the SCIS faculty by the end of February of every even year.

The UGC chair should prioritize recommendations for adjustments to the BS in CS program that require further approval by the College Curriculum Committee. The SCIS Director and/or UPD should expedite SCIS faculty consideration of such recommendations, bearing in mind the deadlines of the College Curriculum Committee, and with a view to implementation at the start of the next academic year.

7) SCIS Faculty Assessment Meeting

The SCIS Director convenes a meeting of the SCIS faculty to consider the UGC recommendations prior to the end of the Spring semester of every even year, if practical, but no sooner than one week following receipt of the UGC summary of recommendations. Should matters be left over from this meeting, such matters should be addressed during the first meeting of the full SCIS faculty in the following Fall semester.

IV. ENACTMENT

- UGC recommendations not requiring faculty approval must be considered by the responsible entity, SAC or UPD, immediately and reported to the next meeting of the full SCIS faculty. The Director or the Associate Director of the School may veto such recommendations if they are deemed to be impractical to implement.
- UGC recommendations approved by the SCIS faculty, and not requiring further approval by the College, must be enacted by the UPD as soon as practicable, and by the start of the following Summer semester if at all possible.
- Recommendations for BS in CS program adjustments approved by the SCIS faculty, and subsequently approved by the College and/or University Committees, must be enacted at the earliest possible date following approval by the highest Committee.

The Undergraduate Program Director has overall responsibility for enactment of all program adjustments resulting from the assessment process. The UPD is charged with documentation and publication of program adjustments.

Revised: February 19, 2015 [Subject Areas are modified]

APPENDIX B-2: BS in CS *Assessment Mechanisms & Procedures*

SCHOOL OF COMPUTING AND INFORMATION SCIENCES ASSESSMENT MECHANISMS AND PROCEDURES of the Bachelor of Science in Computer Science Program

I. INTRODUCTION

The School of Computer and Information Sciences (SCIS) at Florida International University uses several mechanisms to assess the extent to which its undergraduate program outcomes and objectives are being met. Further, the School has defined procedures to evaluate the assessment results and to identify ways to improve its curriculum based on the assessment results, as deemed necessary and appropriate by its faculty.

SCIS currently uses five survey instruments:

1. Course Outcomes Survey by Students
2. Course Outcomes Survey by Instructors
3. Survey of Graduating Students
4. Survey of Alumni
5. Survey of IAB members and Employers

Direct measure of attainment of the Program Educational Objectives is performed by assessment of student performance in the Senior Project course (Capstone course) taken in the students' final semester.

In addition to the data from the survey instruments and Senior Project assessment, SCIS seeks recommendations from other constituents of the BS in CS program, including the Industrial Advisory Board, Women in Engineering and Computer Science group, Students in Technology, Academia, Research, and Service group, and the ACM student chapter.

II. ADMINISTRATIVE STRUCTURE

To administer and evaluate these assessments, SCIS has created an administrative structure that includes:

- the Undergraduate Program Director (UPD),
- the Assessments Coordinator (AC),
- the Subject Area Coordinators (SACs)

The Undergraduate Program Director is appointed by Director of the School.

The Assessments Coordinator and the Subject Area Coordinators are appointed by the Undergraduate Program Director.

Each course in the BS in Computer Science program falls under one of five subject areas, each with its own SAC: Programming, Software Engineering, Computer Systems, Foundations, and Communication & Ethics. Each Subject Area Coordinator is responsible for writing a biennial report detailing recommendations for modifications pertaining to all courses in their respective subject area.

The Assessments Coordinator is responsible for writing a biennial report summarizing the recommendations of the SACs, and recommendations received from the other program constituents. The AC's report is submitted to the SCIS Undergraduate Committee for consideration.

On consideration of the AC and SAC reports, the SCIS Undergraduate Committee may subsequently make recommendations to the full SCIS faculty. Recommendations adopted by the SCIS faculty are implemented via the normal academic procedures of the university.

The Undergraduate Program Director bears the overall responsibility for assessing the undergraduate programs of the School as well as ascertaining that defined procedures are followed in a timely fashion.

III. ASSESSMENT INSTRUMENTS AND PROCEDURES

As indicated earlier, SCIS utilizes data from the survey instruments and Senior Project evaluation, and recommendations from its constituent groups, to assess whether the program outcomes and objectives of the BS in Computer Science program are being met. The details of these assessment mechanisms, and their application, are described below.

A. SURVEY INSTRUMENTS:

SCIS currently uses five survey instruments. All surveys are conducted online. The SCIS Director for IT and Business Relations is responsible for ensuring that meaningful statistics for each survey are available within a month after the survey period concludes.

The student and instructor Course Outcomes Survey statistics are analyzed and reported in the biennial reports of the Subject Area Coordinators.

The Graduating Students and Alumni survey statistics are analyzed and reported in the biennial report of the Assessments Coordinator.

1. Course Outcomes Survey by Students

This survey is undertaken during the final two weeks of every semester.

Students of every class offered during the semester are asked to rate each course outcome from two perspectives by indicating the extent to which they agree or disagree with two assertions about that outcome:

- *I believe that this is a valuable outcome for this course*
- *The subject matter of this outcome was covered adequately in class*

Responses are given on a scale of 1 to 5 with 5 indicating strong agreement with the assertion, and 1 indicating strong disagreement. The students' responses from both perspectives, *value of outcome* and *adequacy of coverage* are averaged across the class, individually for each outcome, and cumulatively for all outcomes

2. Course Outcomes Survey by Instructors

This survey is undertaken at the conclusion of every semester.

For each class offered during any semester, the instructor of the class completes a grid showing how course assignments and tests relate to the individual course outcomes. The instructor rates each course outcome from two perspectives:

- The *appropriateness* of the outcome is rated as one of *essential*, *appropriate*, or *inappropriate*.
- The in-class coverage of the outcome is rated as one of *extensively*, *adequately*, *not enough*, or *not at all*.

The instructor also provides ratings of the *relevance* and *student mastery* of the *course prerequisite outcomes*, and may choose to provide recommendations for additional prerequisite outcomes.

3. Survey of Graduating Students (Student Outcomes)

This survey is undertaken every semester, during the final two weeks of the semester.

The graduating student is asked to rate each of the BS in Computer Science (curricular) Student Outcomes *a* through *k*, from two perspectives.

- The graduating student indicates the extent to which they agree or disagree with the following assertion:
This program outcome has been met for me personally
- The graduating student indicates how meaningful they consider the outcome to be:
How meaningful do you consider this outcome to be for you personally?

Program Educational Objectives *i* and *j* relate to the success of the graduating student in finding CS-related employment, and admission to graduate school respectively. For each of these 2 outcomes, *i* and *j*, the student indicates how successful they have been, and how their CS education has contributed to that success.

Responses to all questions are given on a scale of 0 through 5, with 0 being least favorable, and 5 being most favorable, and are averaged across all students completing the survey.

4. Survey of Alumni (Program Educational Objectives)

This survey is undertaken by graduates of the BS in Computer Science program, and is conducted every three years.

Alumni completing this survey are asked to provide ratings of the several facets of the BS in Computer Science Program Educational Objectives under four broad areas:

- quality of Educational Experience (6 facets)
- quality of Faculty and Instruction (4 facets)
- quality of preparation in the Curricular Areas (4 facets)
- promotion of Diversity and Healthy Environment (4 facets)

Each facet is rated on a scale of 0 (Unsatisfactory) through 4 (Excellent). The ratings are averaged for each individual facet (18), for each area (4), and cumulatively across all facets.

5. Survey of Employers (Program Educational Objectives)

This survey is undertaken by employers of students who received their BS in CS degree from our School. It is conducted once every three to four years.

Employers completing this survey are asked to provide ratings of our students' performance and abilities that are included in the Program Educational Objectives. These are:

- mastery of the fundamental computer science concepts and problem solving using them
- ability to communicate verbally
- ability to communicate in written form
- ability to work cooperatively in a team
- understanding of social and ethical concerns of a practicing computer scientist
- ability to learn emerging and new concepts and technologies

Each aspect is rated on a scale of 0 (Poor) through 4 (Excellent). Average ratings are used for assessment purposes.

B. RECOMMENDATIONS:

Periodically, we seek out recommendations for curricular changes from diverse bodies and interest groups. In all cases, curriculum modifications based on these recommendations will be included in the biennial report submitted by the AC to the School's curriculum committee.

1) Industry Advisory Board (IAB):

The IAB of the School is expected to meet twice a year to discuss among other things, how we can prepare our students better to face the current challenges in the field. The Director of the School, the UPD, and the AC will review these formal and informal recommendations of the Board.

2) Women in Engineering and Computer Science (WIECS) group:

The WIECS women's forum meets occasionally throughout the year under the leadership of a faculty member of the School. The problems faced by women in science areas of endeavor are unique, and we take the recommendations of this group to address their concerns about our curriculum and how can we assist them to perform better and attract more women into our program. The AC and the UPD review the recommendations of the group on a biennial basis.

3) ACM Student Chapter:

The members of our ACM Student Chapter meet periodically throughout the year. Recommendations made by this group through their faculty advisor are reviewed by the AC and the UPD on a biennial basis.

4) Students in Technology, Academia, Research, and Service (STARS) group:

The members of STARS meet periodically throughout the year. Recommendations made by this group through their faculty advisor are reviewed by the AC and the UPD on a biennial basis.

C. DIRECT MEASURES

1. Senior Project Assessment

For the purpose of assessing the BS in CS Program Educational Objectives via the Senior Project, the UPD, in consultation with the faculty, constitutes an evaluation team(s) of at least 3 persons to include

1. The Senior Project course coordinator/instructor (faculty),
2. A second faculty member not associated with the project,
3. A non-faculty representative from the SCIS Industry Advisory Board, or person with similar experience nominated by the Board.

Several such teams may be constituted, based on the number of student projects to be evaluated.

The evaluation team observes the students' oral presentations and/or demonstrations of their project. The evaluation team has access to all artifacts produced by the student team to satisfy the requirements of the Senior Project course.

The members of the evaluation team complete a suitable instrument to indicate their assessment of the extent to which the students' work demonstrates attainment of the BS in Computer Science Program Educational Objectives. The instrument includes rubrics to guide their evaluations. The instrument and included rubrics must be published.

The completed evaluation instruments, together with the project artifacts, become components of the assessment process, and must be maintained until at least the following ABET accreditation site visit.

2. Course-Embedded Assessment

In addition to assessment via the Senior Project, the Undergraduate Program Director and Assessments Coordinator, in consultation with the relevant Subject Area Coordinators, may designate courses for sampling of student work (exams and/or projects), for the purpose of assessing attainment of Student Outcomes. The particular courses to be sampled may be determined from semester to semester. The Subject Area Coordinators will maintain suitable sampling mechanisms and rubrics for assessment of Student Outcomes via the courses in their areas.

IV. IMPLEMENTING CURRICULUM CHANGES:

The Assessment Coordinator's biennial written report is submitted to the SCIS Undergraduate Committee by the end of Fall term of every odd year. The report includes recommended curriculum modifications based on all of the assessment mechanisms. The SCIS Undergraduate Committee completes all internal deliberations in the School by the end of February of every even year. The SCIS faculty considers these recommendations by the end of the Spring term of every even year if practical. In the worst case, the faculty considers them in early Fall term of every even year. The faculty approved changes in our curriculum are submitted to the College Curriculum Committee at the earliest possibility. The University approved curriculum modifications are implemented no later than in the subsequent Fall semester.

Revised: February 19, 2015

APPENDIX C: Subject Area Coordinator Reports

Subject Area Coordinator Report
Applications
Summer 2017 – Spring 2019
Mark A. Finlayson
February 11, 2022

Subject Area: Applications

The Applications subject area comprises the following five courses:

1. CAP 4104: Human-Computer Interaction
2. CAP 4453: Introduction to Robot Vision
3. CAP 4630: Artificial Intelligence
4. CAP 4641: Natural Language Processing
5. CDA 4625: Introduction to Mobile Robotics

CAP 4104: Human-Computer Interaction

CAP 4104 was taught twice during the evaluation period, in Spring 2018 by Associate Professor Christine Lisetti and in Spring 2019 by Visiting Instructor Gregory Reis. Student evaluations were collected for both terms, but an instructor evaluation was only received in 2019.

| | Instructor | # of Student Responses | Overall Valuation of the Outcomes | Overall Adequacy of Coverage of the Outcomes |
|-------------------------|------------|------------------------|-----------------------------------|--|
| Spring 2018 | Lisetti | 37 | 4.84 | 4.68 |
| Spring 2019 | Reis | 21 | 5.00 | 5.00 |
| Sum or Weighted Average | | 58 | 4.90 | 4.80 |

The students rated each of the outcomes roughly equally valuable for the course.

Student comments included:

- Have this class mandatory to take with Software Engineering I.

Instructor evaluations included:

- Student preparation was good
- All objectives were essential, except for one that was appropriate

While the suggestion to make this class required is an interesting one, this goes against the recent changes in the SCIS curriculum to remove requirements so as to give students more flexibility.

Recommendation: No changes

CAP 4453: Introduction to Robot Vision

This course was not offered during the evaluation period. Therefore, no data is available to make recommendations for modification of the course.

CAP 4630: Artificial Intelligence

CAP 4630 was taught once during the evaluation period, in Fall 2017 by Assistant Professor Sam Ganzfried. Both student evaluations and instructor evaluations were received.

| | Instructor | # of Student Responses | Overall Valuation of the Outcomes | Overall Adequacy of Coverage of the Outcomes |
|-----------|------------|------------------------|-----------------------------------|--|
| Fall 2017 | Ganzfried | 24 | 3.79 | 3.38 |

Student reactions to this class were negative, with at least five students (20% of the class) strongly disagreeing of the importance of the overall value of the outcomes and the overall adequacy of coverage. Student negative reactions seemed to have a lot to do with poor teaching by the instructor (for example, reading long text-heavy slide decks), as well as the amount of homework that was assigned and the length of the exams, with several students suggesting the amounts were either completely or very unreasonable. At least three free text comments suggested that the course covered too much material, and I agree after my own review of the course syllabus. In particular, the course includes a large unit on game theory and multiagent systems, which strikes me as inappropriate for an introductory undergraduate class on AI.

Instructor evaluations included:

- Student preparation was adequate
- All objectives were essential

Recommendations: (1) Remove the unit on game theory and multi agent systems. (2) remove mixed integer programming, linear programming, and MDPs from unit two. (3) Spread the remaining material across the allotted time.

CAP 4641: Natural Language Processing

CAP 4641 was taught twice during the evaluation period, once each in Spring 2018 and in Spring 2019, both by Assistant Professor Mark Finlayson. Student and instructor evaluations were received for each term, although in Spring 2019 only 4 students filled out an evaluation.

| | Instructor | # of Student Responses | Overall Valuation of the Outcomes | Overall Adequacy of Coverage of the Outcomes |
|-------------------------|------------|------------------------|-----------------------------------|--|
| Spring 2018 U01 | Finlayson | 32 | 4.91 | 4.75 |
| Spring 2019 U01 | Finlayson | 4 | 5.00 | 5.00 |
| Sum or Weighted Average | | 36 | 4.92 | 4.77 |

Students evaluated positively the overall value of the outcomes and their coverage. Instructor evaluations included:

- Student preparation was adequate
- All objectives were essential

Recommendations: No changes.

CDA 4625: Introduction to Mobile Robotics

CDA 4625 was offered twice during the evaluation period, once each in Spring 2018 and Spring 2019, taught both times by Associate Professor Leonardo Bobadilla. Course evaluations from the students were received only for the Spring 2018 term. Instructor evaluations were received in both terms.

| | Instructor | # of Student Responses | Overall Valuation of the Outcomes | Overall Adequacy of Coverage of the Outcomes |
|-----------------|------------|------------------------|-----------------------------------|--|
| Spring 2018 U01 | Bobadilla | 24 | 4.79 | 3.92 |

The students were overall positive on the value of the outcomes, but less so in their coverage. The two comments dealt with changing the mode of information transmission: either more hands-on work or more visual examples. These specific student comments included:

- More hands on with robots. Most was conceptual but there was really a lack of application. There should be a regular lab working on robots (especially towards the final robot project).
- Have more YouTube videos and pictures showing examples of the material.

Although the instructor submitted evaluation forms, he did not rate the appropriateness or coverage of the learning objectives or rate the students' preparation for the course.

Recommendation: Include more hands-on and visual material.

Computer Organization: Subject Area Coordinator Report

Nagarajan Prabakar

November 2, 2019

Introduction:

The Computer Organization area consists of the following five courses with syllabi links:

- [CDA-3102](#) Computer Architecture
- [CDA-3103](#) Fundamentals of Computer Systems
- [CDA-4101](#) Structured Computer Organization
- [CNT-4713](#) Net-Centric Computing
- [COP-4610](#) Operating Systems Principles

CDA-3102 is a new course to replace CDA-3103 and CDA-4101. Since CDA-3102 will be offered only from Spring 2020, there is no evaluation for this course. The assessment report given below for all other courses is based on student responses about the course outcomes and the faculty course appraisals.

1. CDA-3103: Fundamentals of Computer Systems

The following table shows a summary of the course assessment evaluations:

| | <u>No. of Student</u> <u>Responses</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | <u>Usernames of</u> <u>Instructors</u> |
|-------------|---|-----------------------------------|------------------------------------|--|
| Summer 2017 | 13 | 4.65 | 4.62 | pestaina |
| Fall 2017 | 27 | 4.00 | 3.80 | pestaina, tcickovs, cabrcarl |
| Spring 2018 | 19 | 4.44 | 3.86 | junli, tcickovs, cabrcarl, milani |
| Summer 2018 | 6 | 4.52 | 4.63 | prabakar, milani |
| Fall 2018 | 11 | 4.17 | 3.91 | fsaeed, tcickovs, cabrcarl, caralons, milani |
| Spring 2019 | 6 | 3.72 | 3.61 | junli, tcickovs, cabrcarl, caralons, milani |
| | ===== | ===== | ===== | |
| Total | 82 | 4.24 | 4.00 | Weighted Avg |

For all five outcomes of the course, most of the students (80%) agree either strongly or moderately. There is no significant concern expressed in the Students Suggestions section.

Recommendation: Continue the use interactive textbooks (Zybooks) in the new course CDA-3102 since ZyBooks was helpful in improving student learning.

2. CDA-4101: Structured Computer Organization

The following table shows a summary of the course assessment evaluations:

| | <u>No. of Student</u> <u>Responses</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | <u>Usernames of</u> <u>Instructors</u> |
|-------------|---|-----------------------------------|------------------------------------|---|
| Summer 2017 | 0 | 0.00 | 0.00 | prabakar |

| | | | | |
|-------------|-------|-------|-------|------------------------------|
| Fall 2017 | 23 | 4.38 | 4.04 | prabakar, tcickovs |
| Spring 2018 | 26 | 4.57 | 4.51 | prabakar, tcickovs, farahman |
| Summer 2018 | 3 | 4.27 | 4.53 | prabakar, farahman |
| Fall 2018 | 8 | 4.30 | 3.60 | prabakar, tcickovs, farahman |
| Spring 2019 | 4 | 3.65 | 3.65 | prabakar, tcickovs, farahman |
| | ===== | ===== | ===== | |
| Total | 64 | 4.40 | 4.18 | Weighted Avg |

For all five outcomes of the course, most of the students (more than 80%) agree either strongly or moderately. Students expressed a big learning curve in writing Verilog code for designs. Also, there was concern about sharing the work in group projects and the credit for each team member. There is no significant concern expressed by the students or faculty.

Recommendation: An introductory lecture with online resources for Verilog at the beginning of the term is essential. For each group project, include peer evaluations among group members.

3. **CNT-4713: Net-Centric Computing**

The following table shows a summary of the course assessment evaluations:

| | <u>No. of Student Responses</u> | <u>Value of Outcome</u> | <u>Coverage Adequacy</u> | <u>Username of Instructors</u> |
|-------------|---------------------------------|-------------------------|--------------------------|--------------------------------|
| Summer 2017 | 14 | 4.90 | 4.87 | downeyt |
| Fall 2017 | 37 | 4.83 | 4.72 | downeyt, dvill013 |
| Spring 2018 | 36 | 4.49 | 3.75 | forte007 |
| Summer 2018 | 3 | 5.00 | 4.85 | forte007 |
| Fall 2018 | 5 | 4.89 | 4.66 | downeyt, kgholami |
| Spring 2019 | 7 | 4.96 | 4.75 | kgholami, kiahme |
| | ===== | ===== | ===== | |
| Total | 102 | 4.73 | 4.40 | Weighted Avg |

For all seven outcomes of the course, most of the students (more than 80%) agree either strongly or moderately. There is no significant concern expressed by the students or faculty.

Recommendation: No change is needed on the course outcomes or syllabus.

4. **COP-4610: Operating Systems Principles**

The following table shows a summary of the course assessment evaluations:

| | <u>No. of Student Responses</u> | <u>Value of Outcome</u> | <u>Coverage Adequacy</u> | <u>Username of Instructors</u> |
|-------------|---------------------------------|-------------------------|--------------------------|--------------------------------|
| Summer 2017 | 14 | 4.46 | 4.04 | osorioj |
| Fall 2017 | 28 | 4.78 | 4.61 | forte007, liux |

| | | | | |
|-------------|-------|-------|-------|--------------------|
| Spring 2018 | 23 | 4.79 | 4.56 | lhu, raju |
| Summer 2018 | 8 | 4.50 | 4.15 | osorioj |
| Fall 2018 | 10 | 4.80 | 4.48 | dochen, liux, raju |
| Spring 2019 | 7 | 4.54 | 4.37 | lhu, raju |
| | ===== | ===== | ===== | |
| Total | 90 | 4.69 | 4.44 | Weighted Avg |

For all five outcomes of the course, most of the students (more than 80%) agree either strongly or moderately. There is no significant concern expressed by the students or faculty.

Recommendation: No change is needed on the course outcomes or syllabus.

Overall observation: Student participation in the course evaluation system since Summer 2018 is consistently low. This may be due to the migration of the evaluation process to fully online mode after Spring 2018. Perhaps students who complete course evaluation before the final exam week, may be given preference in advising, student workshop registrations, etc.

Assessment of 2017 - 2019 Foundations Courses

Xudong He
October 23, 2019

1 Introduction

The Foundations courses are CAP-4506 (Introduction to Game Theory), COP 4534 (Algorithm Techniques), COP 4555 (Principles of Programming Languages), COT-3100 (Discrete Structures), COT 3541 (Logic for Computer Science), COT 4521 (Introduction to Computational Geometry), MAD 2104 (Discrete Mathematics), MAD 3512 (Theory of Algorithms), and the math electives. There are no students' evaluations and no instructor appraisals from these two Math Department courses.

2 CAP 4506 Introduction to Game Theory

This course was only offered once in the past two years. Richard Whittaker taught it in Spring 2019. Three students submitted course evaluations, but did not provide any answers on Course Outcomes. The only student suggestion was "would like to have more homework and projects to cement the concepts". The instructor did not provide any comments or suggestions in course appraisal.

3 COP 4534 Algorithm Techniques

This course was taught 4 times all by Ning Xie in Fall 2017, Spring 2018, Fall 2018, and Spring 2019 respectively.

The following table shows a summary of the student evaluations:

| | <u>#</u> <u>Responding</u> | <u>Outcome</u> <u>Value</u> | <u>Coverage</u> <u>Adequacy</u> |
|----------------|-------------------------------|--------------------------------|------------------------------------|
| Fall 17 | 9 | 4.56 | 4.15 |
| Spring 18 | 7 | 4.62 | 4.24 |
| Fall 18 | 2 | 5.00 | 5.00 |
| Spring 19 | 2 | 4.67 | 3.50 |
| | ===== | ===== | ===== |
| Year 2017 – 19 | 20 | 4.64 | 4.20 |

The overall student evaluations were very good. Most students' comments were on homework assignments. Some student felt the homework assignments were very rewarding and challenging. Several students felt more homework assignment were needed in Fall 2017; however one student comment in 2019 suggested to reduce homework by one. Obvious, Prof. Xie adjusted the number of assignments during the past two years. A few early student comments in Fall 2017 were about more discussion and review for exams and making lectures more organized and engaged.

The instructor's comment on student preparation went from deficient in Fall 2017 to adequate afterwards, and suggested that students to have some basic knowledge of combinatorics, statistics, and probability before taking this course.

4 COP 4555 Principles of Programming Languages

Xudong He taught one section of COP 4555 in Summer 2017 and Summer 2018. Geoff Smith taught one section of COP 4555 in Fall 2017. Jai Navlakha taught one section of COP 4555 in Fall 2017 and Fall 2018. Tim Downey taught three sections of COP 4555 in Spring 2018, and Spring 2019 respectively. Gregory Murad taught one section of COP 4555 in Fall 2018 and Spring 2019. Some summer student evaluations were not available.

The following table shows a summary of the student evaluations:

| | <u>#</u> <u>Responding</u> | <u>Outcome</u> <u>Value</u> | <u>Coverage</u> <u>Adequacy</u> |
|----------------------|-------------------------------|--------------------------------|------------------------------------|
| Fall 17 (Navlakha) | 9 | 4.37 | 4.35 |
| Fall 17 (Smith) | 12 | 4.32 | 4.10 |
| Spring 18-1 (Downey) | 6 | 4.28 | 4.25 |
| Spring 18-2 (Downey) | 5 | 4.70 | 4.53 |
| Spring 18-3 (Downey) | 2 | 4.58 | 4.58 |
| Fall 18 (Murad) | 1 | 5.00 | 5.00 |
| Fall 18 (Navlakha) | 1 | 4.17 | 4.50 |
| Spring 19-1 (Downey) | 5 | 4.73 | 4.86 |
| Spring 19-2 (Downey) | 2 | 4.92 | 5.00 |
| Spring 19-3 (Downey) | 1 | 5.00 | 5.00 |
| Spring 19 (Murad) | 1 | 2.83 | 3.00 |
| | ===== | ===== | ===== |
| Year 2017-19 | 45 | 4.44 | 4.50 |

The overall student evaluations were very good, however the overall student responses were low (many classes had only 1 or 2). Student comments included to have more variation of practice exercises, to have a textbook, to have more quizzes, to have extra points for students willing to put in extra effort, to provide solutions for homework assignments. A few comments mentioned Downey was a great professor.

Students' preparation for this course ranges from adequate to good. The only few professor appraisal comments included students need better mathematics preparation to understand the essential concepts of functions, sets, and relations; and better rigorous thinking and logical reasoning capabilities; and the course be taught in a laboratory to practice programming in F#.

5 COT 3100 Discrete Structures

Masoud Milani taught one section in Summer 2017, one section in Spring 2018, one section in Summer 2018, one section in Fall 2018, and one section in Spring 2019. Antonio Bajuelos taught one section in Summer 2017, one section in Fall 2017, two sections in Spring 2018, one section in Summer 2018, and two sections in Spring 2019. Mark Finlayson taught one section in Fall 2018. Kianoosh Boroojeni taught three sections in Fall 2017, three sections in Spring 2018, two sections in Fall 2018, and three sections in Spring 2019. Richard Whittaker taught two sections in Summer 2018, three sections in Fall 2018, and one section in Spring 2019. Summer 2018 student evaluations and several Spring 2019 student evaluations were not available.

The following table shows a summary of the student evaluations:

| | <u>#</u> <u>Responding</u> | <u>Outcome</u> <u>Value</u> | <u>Coverage</u> <u>Adequacy</u> |
|-------------------------|-------------------------------|--------------------------------|------------------------------------|
| Summer 17 (Milani) | 2 | 4.00 | 4.00 |
| Summer 17 (Bajuelos) | 4 | 4.33 | 4.25 |
| Fall 17 (Finlayson) | 7 | 4.35 | 4.31 |
| Fall 17 (Bajuelos) | 1 | 1.83 | 1.83 |
| Fall 17-1 (Boroojeni) | 3 | 4.47 | 4.53 |
| Fall 17-2 (Boroojeni) | 2 | 2.71 | 3.00 |
| Fall 17-3 (Boroojeni) | 5 | 3.45 | 3.50 |
| Spring 18-1 (Bajuelos) | 2 | 5.00 | 4.93 |
| Spring 18-2 (Bajuelos) | 2 | 4.71 | 4.93 |
| Spring 18-1 (Boroojeni) | 12 | 4.40 | 4.56 |
| Spring 18-2 (Boroojeni) | 8 | 4.51 | 4.23 |
| Spring 18-3 (Boroojeni) | 6 | 4.55 | 4.57 |
| Spring 18 (Milani) | 3 | 4.05 | 3.52 |
| Fall 18-1 (Whittaker) | 3 | 5.00 | 5.00 |
| Fall 18-2 (Whittaker) | 1 | 4.14 | 4.43 |
| Fall 18-3 (Whittaker) | 1 | 4.14 | 5.00 |
| Fall 18-1 (Boroojeni) | 1 | 5.00 | 4.86 |
| Fall 18-2 (Boroojeni) | 2 | 4.29 | 4.43 |
| Fall 18 (Hernandez) | 1 | 4.75 | 5.00 |
| Spring 19 (Bajuelos) | 3 | 4.52 | 4.52 |
| Spring 19-1 (Boroojeni) | 2 | 4.21 | 4.21 |
| Spring 19-2 (Boroojeni) | 1 | 5.00 | 5.00 |
| Spring 19-1 (Boroojeni) | 3 | 4.10 | 4.71 |
| Spring 19 (Whittaker) | 3 | 5.00 | 4.71 |
| | ===== | ===== | ===== |
| Year 2017-19 | 78 | 4.34 | 4.35 |

The overall student evaluations were very good, however the overall student responses were low (many classes had only 1 to 3). Student comments included to have more homework assignments and in class practice, to provide some tutoring, and to use a better textbook in some section. Overall the students felt this was a challenging course, on the other hand, they also praised professors in doing a great job. Instructors Finlayson, Whittaker, and Boroojeni received multiple excellent compliments on their knowledge and delivery.

Students' preparation for this course ranges from non-existent, deficient, adequate to good. The only few professor appraisal comments included (1) student must develop stronger work ethics to enrolling in this course, (2) the number of the objectives is too high, (3) compress outcomes related to programming into a single outcome and make it be "familiarity" rather than implementation, (4) students have a very low level of

math and logical reasoning and therefore it is very difficult for them to formalize problems and proofs, (5) there is no time to properly cover some of the objectives related to program implementation.

6 COT 3541 Logic for Computer Science

Antonio Bajuelos taught one section in Summer 2017, two sections in Fall 2017, two sections in Spring 2018, one section in Summer 2018, three sections in Fall 2018, and two sections in Spring 2019. Antonio Hernandez taught one section in Fall 2017, one section in Spring 2018, one section in Summer 2018, one section in Fall 2018, and one section in Spring 2019. 2018 Summer student evaluations and several Spring 2019 student evaluations were not available.

The following table shows a summary of the student evaluations:

| | <u>#</u> | <u>Outcome</u> | <u>Coverage</u> |
|------------------------|-------------------|----------------|-----------------|
| | <u>Responding</u> | <u>Value</u> | <u>Adequacy</u> |
| Summer 17 (Bajuelos) | 2 | 5.00 | 4.62 |
| Fall 17-1 (Bajuelos) | 8 | 4.75 | 4.84 |
| Fall 17-2 (Bajuelos) | 9 | 4.66 | 4.74 |
| Fall 17 (Hernandez) | 2 | 4.50 | 4.50 |
| Spring 18-1 (Bajuelos) | 5 | 4.60 | 4.90 |
| Spring 18-2 (Bajuelos) | 2 | 4.61 | 4.79 |
| Spring 18 (Hernandez) | 4 | 5.00 | 4.62 |
| Fall 18-1 (Bajuelos) | 3 | 4.58 | 4.75 |
| Fall 18-2 (Bajuelos) | 4 | 5.00 | 5.00 |
| Fall 18 (Hernandez) | 1 | 4.75 | 5.00 |
| Spring 19 (Hernandez) | 2 | 5.00 | 5.00 |
| | ===== | ===== | ===== |
| Year 2017-19 | 42 | 4.75 | 4.80 |

The overall student evaluations were outstanding, however the overall student responses were low. Student comments included to connect logic to real world applications, to have homework graded or provide answers, to have more consistency among the professors teaching the same course, to have quick email response to student questions, to have videos for explaining course materials, to have more time on Prolog, to have a better textbook, and to have more examples. One comment of the online offering was to change discussion posts to classwork.

Students' preparation for this course was adequate. The only few professor appraisal comments included this course has effectively challenged students to think and logic provides the unifying foundation for computer science. One suggestion was to explicitly cover propositional logic to help students have a consistent and systematic knowledge of various concepts in logic.

7 COT- 4521 Introduction to Computational Geometry

Wei Zeng taught one section of COP 4521 in Fall 2018. There was no student evaluation for this course available.

Wei Zeng felt that the overall student preparation for this course was good, but additional prerequisites such as linear algebra and programming could be helpful, and using more demos could also help student understanding.

8 Recommendations

There are a few common problems in the above foundation courses, including (1) deficiency of students' preparation in math and logical thinking and (2) how to help students to better understand course materials and prepare for exams. The offering of COT-3100 discrete structures may alleviate problem (1) for some other courses, but itself encounters the same problem. To address problem (2), homework grading criteria need to be changed to discourage homework copying and encourage student efforts; and in-class practices and quizzes are used to improve students understanding of fundamental concepts and performance on exams. Several observations include low student evaluation responses and missing appraisal comments from several instructors consistently, which need to be addressed to improve learning.

Professional Development: Subject Area Coordinator Report

Richard Whittaker

October 19, 2019

Subject Area: Professional Development

CGS 1920: Introduction to Computing

CGS 3095: Technology in the Global Arena

ENC 3249: Professional and Technical Writing for Computing

The following report was generated by utilizing data from the Course Appraisal and Course Evaluation Systems and covers the time period from Summer 2017 to Spring 2019.

Review of CGS 1920

CGS 1920: Introduction to Computing

| | # Responses | Value of Outcome | Coverage Adequacy | Instructor |
|-------------|-------------|------------------|-------------------|------------------|
| Summer 2017 | 8 | 4.77 | 4.80 | tsolis |
| Fall 2017 | 6 | 4.36 | 4.38 | juanc, tsolis |
| Spring 2018 | 16 | 4.15 | 4.20 | juanc, tsolis |
| Summer 2018 | NA | | | |
| Fall 2018 | 2 | 4.29 | 4.5 | tsolis |
| Spring 2019 | 7 | 4.84 | 4.83 | juanc, tsolis |
| Total | 39 | 4.44 | 4.48 | Weighted Average |

The faculty that have taught this course have discussed changing the title of this course to “Intro to the Field of Computing”. In the past, it has been brought up to change the title to "Seminar in Computing" to clarify that it is not a programming course. Currently, the faculty believes that “Intro to the Field of Computing” would be a better choice.

Recommendation: No changes are recommended.

Review of CGS 3095

CGS 3095: Technology in the Global Arena

| | # Responses | Value of Outcome | Coverage Adequacy | Instructor |
|-------------|-------------|------------------|-------------------|-------------------------|
| Summer 2017 | 39 | 4.38 | 4.21 | crahn, mlangen |
| Fall 2017 | 22 | 4.77 | 4.61 | crahn, grahams, mlangen |
| Spring 2018 | 38 | 4.73 | 4.77 | crahn, grahams, mlangen |
| Summer 2018 | NA | | | |

| | | | | |
|-------------|-----|------|------|-------------------------|
| Fall 2018 | 13 | 4.53 | 4.54 | crahn, grahams, mlangen |
| Spring 2019 | 7 | 4.30 | 4.44 | crahn, grahams, mlangen |
| Total | 119 | 4.58 | 4.51 | Weighted Average |

The majority of students found the course material beneficial and adequate for understanding key computing related issues. Some students requested that the course material to include more focus on the impacts of social media and destructiveness of tech startups. In addition, a few students commented that the textbook was not helpful for the course.

Recommendation: No changes are recommended.

Review of ENC 3249

ENC 3249: Professional and Technical Writing for Computing

The Course Appraisal and Course Evaluation Systems did not provide data regarding this course. Reason being this course is taught by the English Department. Using the CGS 3095 course which has writing assignments as a proxy, students’ writing skills were found to range from deficient to adequate.

Recommendation: No changes are recommended.

Programming: Subject Area Coordinator Report

Tim Downey
October 29, 2019

Subject Area: Programming

- COP 2210** Computer Programming I
- COP 3337** Computer Programming II
- COP 3530** Data Structures
- COP 4226** Advanced Windows Programming
- COP 4338** Computer Programming III
- COP 4520** Introduction to Parallel Computing

The assessment report for each of these courses is based on student responses about the course outcomes and the faculty course appraisals.

COP 2210 – Computer programming I

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | <u>Instructor</u> |
|-------------|-------------------------------|-----------------------------------|------------------------------------|---|
| Summer 2017 | 57 | 4.73 | 4.64 | Charters, Pestaina |
| Fall 2017 | 40 | 4.46 | 4.07 | Hernandez, Shaw, Davis |
| Spring 2018 | 21 | 4.46 | 4.21 | Rahaman, Hernandez, Shaw, Davis |
| Summer 2018 | 26 | 4.85 | 4.75 | Rahaman, Charters |
| Fall 2018 | 19 | 4.34 | 4.12 | Rahaman, Hernandez, Shaw, Davis, Whittaker |
| Spring 2019 | 10 | 4.74 | 4.26 | Rahaman, Ivanosk, Hernandez, Shaw, Davis, Whittaker |
| | ===== | ===== | ===== | |
| | 173 | 4.61 | 4.39 | Weighted Average |

For the outcomes of the course, most of the students value them and feel that they were covered adequately.

From instructor course appraisals, students seem to be deficient in mathematical preparation for the course. Some instructors want a math prerequisite, others want a programming prerequisite. Since the time of these comments, a prerequisite of pre-calculus has been added to the course. Other comments are varied: enforce objects first; do not cover arrays, only cover array list; limit enrollment to CS majors, create a problem-solving prerequisite; require a lab or loaner laptops that can be kept throughout the semester.

Recommendation: Continue to evaluate the effectiveness of the math prerequisite, but do not change the prerequisite at this time. Continue to urge instructors to cover all the outcomes of the course. No change is needed on the course outcomes or syllabus.

COP 3337 -- Computer Programming II

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | |
|-------------|-------------------------------|-----------------------------------|------------------------------------|---|
| Summer 2017 | 40 | 4.64 | 4.16 | Rahn, Ortega |
| Fall 2017 | 23 | 4.64 | 4.42 | Rahn, Feild, Smith, Shaw, Pestaina |
| Spring 2018 | 27 | 4.35 | 4.08 | Rahn, Feild, Smith, Shaw, Alam |
| Summer 2018 | 10 | 4.40 | 4.11 | Rahn, Boroojeni, Smith |
| Fall 2018 | 8 | 4.24 | 3.66 | Rahn, Feild, Smith, Whittaker, Charters |
| Spring 2019 | 15 | 3.71 | 3.54 | Rahn, Boroojeni, Smith, Feild, Navlakha, Shaw |
| | ===== | ===== | ===== | |
| | 123 | 4.42 | 4.08 | Weighted Average |

The outcomes have value to the students. Most of the coverages are adequate, except for Fall 2018 and Spring 2019. Many students complain about the presentation of the course by an instructor.

From instructor course appraisals, students seem to be deficient in several of the prerequisite outcomes: methods and parameters; selection and iteration; String, ArrayList and Wrappers. One instructor noted a deficiency in all the prerequisite outcomes. An online instructor is requesting more student preparation for working online. Students are also lacking in problem solving ability. One instructor recommends removing the 'be familiars' from the course outcomes. Several instructors requested a common final exam in COP2210 or an entrance exam to COP3337. A common them is that the outcomes for COP2210 must be met before students can progress to COP3337.

Recommendation: The school has instituted a new design for COP2210, with fewer sections and a common exam. This should address the concern of students having diverse preparation for the course. The low coverage in some semesters is not a problem with the structure of the course, but with the presentation of the material. All instructors should be encouraged to cover all the material in a meaningful way. A review of the outcomes should be made to assess if removing some of the outcomes would maintain the content of the course and allow more time for other topics.

COP 3530 -- Data Structures

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | |
|-------------|-------------------------------|-----------------------------------|------------------------------------|-----------------------------|
| Summer 2017 | 6 | 4.48 | 4.43 | Bajuelo |
| Fall 2017 | 32 | 4.63 | 4.49 | Bajuelo, Hernandez |
| Spring 2018 | 27 | 4.40 | 4.23 | Bajuelo, Hernandez |
| Summer 2018 | 11 | 4.28 | 4.02 | Bajuelo |
| Fall 2018 | 13 | 4.73 | 4.76 | Bajuelo, Hernandez |
| Spring 2019 | 8 | 4.88 | 4.73 | Bajuelo, Hernandez, Ivanosk |
| | ===== | ===== | ===== | |
| | 97 | 4.55 | 4.42 | Weighted Average |

The topics are valued by the students and are covered adequately. There is no significant concern about the outcomes expressed in the Students Suggestions section. From instructor course appraisals, students seem to be deficient in linked lists, stacks, collections and recursion.

Recommendation: COP3337 instructors should ensure that all course outcomes are met. No change is needed in the course outcomes or syllabus.

COP 4226 -- Advanced Windows Programming

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | |
|-----------|-------------------------------|-----------------------------------|------------------------------------|------------------|
| Fall 2017 | 13 | 4.47 | 4.53 | Downey |
| Fall 2018 | 4 | 4.56 | 4.50 | Downey |
| | ===== | ===== | ===== | |
| | 17 | 4.49 | 4.52 | Weighted Average |

The topics are valued by the students and are covered adequately. There is no significant concern expressed in the Students Suggestions section.

One of the outcomes for the course includes database connectivity. A database course is not a prerequisite for this course, so it is difficult to cover database connectivity adequately. The instructor recommends removing database connectivity from the outcomes.

Recommendation: Remove database connectivity from the outcomes.

COP 4338 -- Computer Programming III

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | |
|-------------|-------------------------------|-----------------------------------|------------------------------------|--------------------------|
| Summer 2017 | 14 | 4.55 | 4.64 | Rahn, Ortega |
| Fall 2017 | 33 | 4.58 | 4.18 | Rahn, Feild |
| Spring 2018 | 22 | 4.68 | 3.84 | Rahn, Feild |
| Summer 2018 | 9 | 4.43 | 3.62 | Rahn, Osorio, Boroojeni |
| Fall 2018 | 14 | 4.53 | 4.02 | Rahn, Feild |
| Spring 2019 | 4 | 4.59 | 4.16 | Rahn, Field, Alonso, Liu |
| | ===== | ===== | ===== | |
| | 96 | 4.58 | 4.09 | Weighted Average |

Students value the outcomes of the course, but the coverage was low in Spring and Summer 2018. Students complained about the presentation of the material by an instructor.

From instructor course appraisals, students seem to be deficient in problem solving and documentation standards. Instructors would like more time to be able to cover multi-threading and synchronization. It would be beneficial if students already knew UNIX before this course. One instructor noted that students were deficient in pointers and C data structures. We do not have a prerequisite course that could cover pointers, C data structures, or UNIX.

Recommendation: The low coverage in some semesters is not a problem with the structure of the course, but with the presentation of the material. All instructors should be encouraged to cover all the material in a meaningful way. Instructors should be asked if there is enough time to cover the advanced material in the course while providing introductions to UNIX, pointers, and C data structures.

COP 4520 -- Introduction to Parallel Computing

| | <u>#</u> <u>Responding</u> | <u>Value of</u> <u>Outcome</u> | <u>Coverage</u> <u>Adequacy</u> | |
|-------------|-------------------------------|-----------------------------------|------------------------------------|------------------|
| Spring 2018 | 5 | 4.80 | 4.63 | Liu |
| Spring 2019 | 2 | 4.92 | 4.58 | Liu |
| | ===== | ===== | ===== | |
| | 7 | 4.83 | 4.62 | Weighted Average |

The students agree that the outcomes of the course have value and that the instructor covers all the topics adequately. There is no significant concern expressed in the Students Suggestions section.

Recommendation: No change is needed on the course outcomes or syllabus.

Subject Area: Software Engineering

Masoud Sadjadi

CEN 4010 – Software Engineering I

- **Summary of Assessment:**

This course was taught in every semester during the past two years. According to all the instructors of this course, the relevancy of the prerequisites was rated from useful to highly useful and mastery of the students was rated from adequate to good. Students' preparedness was indicated as good or adequate and in one instance deficient.

| CEN 4010 | Prerequisite | | | | Student Preparedness |
|-------------|--------------------------|---------|-----------------|----------|----------------------|
| | COP 3530 Data Structures | | | | |
| | Programming | | Data Structures | | |
| | Relevance | Mastery | Relevance | Mastery | |
| Summer 2017 | ---- | ---- | ---- | ---- | ---- |
| Fall 2017 | Highly Useful | Good | Highly Useful | Good | Adequate |
| Spring 2018 | Highly Useful | Good | Useful | Adequate | Adequate |
| Summer 2018 | ---- | ---- | ---- | ---- | ---- |
| Fall 2018 | Highly Useful | Good | Highly Useful | Good | Good |
| Spring 2019 | Highly Useful | Good | Highly Useful | Good | Deficient |

According to the survey by 58 students, the average overall outcome is 4.66 out of 5 and the average coverage adequacy is 4.23 out of 5.

| CEN 4010 | # Responding | Overall Outcome | Coverage Adequacy |
|--------------|--------------|-----------------|-------------------|
| Summer 2017 | 6 | 4.62 | 4.06 |
| Fall 2017 | 25 | 4.88 | 4.58 |
| Spring 2018 | 18 | 4.81 | 4.66 |
| Summer 2018 | ---- | ---- | ---- |
| Fall 2018 | 5 | 4.74 | 4.28 |
| Spring 2019 | 4 | 4.25 | 3.59 |
| Year 2017-19 | 58 | 4.66 | 4.234 |

Instructors' comments:

- The course objectives should be evaluated to provide a more modern approach to software development. Some of the concepts which are covered rely on waterfall development which is very hard to find in practice under most modern product development shops.
- As the professor of this course, I have no objections to the current listed pre-requisites. With that being said, I do hear grumblings from the students about that are split on the necessity of Net-Centric for this course. It might be worth having a discussion about the knowledge set required to be successful in CEN4010. I have found in the two semesters that I have taught this course, that while students complain about their perceived preparedness for the course, they typically find a way to have a working finished product at the completion of the course.

- Since the expectation is that students know the Agile software development process prior to Senior Project, I do believe it is time to evaluate the text for this course. Currently the text presents the waterfall method and as such the professor is sort of bound to this method. This semester, I presented both methods and allowed the student-teams to decide which method they wanted to leverage for their product development. This typically leaves half the class underexposed to this method going into the Senior Design project. It is my recommendation that we seek a text that better aligns with the expectations of the follow-on course in order to better prepare students for that capstone course.
- Students are generally prepared technically but struggle immensely with navigating teamwork. Opportunities in prior courses to work in teams might aid in developing skills for navigating challenges associated with working with others.
- Given that this course is the prerequisite to Senior Design, I believe that an update to the text to align with the expectations of the follow-on course would serve the students better. The current text adopts and advocates for the waterfall process (which the students should be made aware of); however, it might serve the students better to adopt a text that better aligns with expectations - an agile methods book.

Students' comments:

- Prepare students more on how to work in a team efficiently (Code Sharing, git, etc.)
- My only complaint was that the class was held in the evening, and because it is largely based on a group project, my teammates and I often felt lethargic by the time we attended.
- This course is straight forward and handles group dynamics very well. In hindsight, I would suggest making Net-Centric Computing a pre-req for this course. Many students come into this course with no knowledge of simple application functions such as GET and POST request. I will additionally mention that is no required CS course dealing with front end manipulation so I would suggest including it with some part of a class.
- We need actual software development and less paperwork.
- Don't calculate points toward our grade for participation. FIU is a commuter school, and as such, MANY of us have to drive 30-45 minutes, in GOOD conditions (depends greatly since we're in Miami), and some drive even LONGER in good conditions. Sometimes, it's hard to get there on time when you live so far. Sometimes it's hard to get there at all due to a classic Miami traffic jam (we all know how long those can last). So, don't penalize us for participation... If we feel we can learn the material for that day on our own, let us do that please.
- ... I do not understand why Netcentric is a Co-requisite. Both classes have nothing in common so far. The only way I can see they can relate is if Netcentric should have a project that can be done using software testing.
- I would love to have this class be thought without having to take other courses. That way it will be closer to the real work experience.
- Split into two courses, one about planning and introduction to application stacks (with homework to learn front-end and back-end frameworks) and the second part revolving around creating an application
- One of the greatest classes I have ever taken. More classes should be taught with the openness that Ross teaches.
- This class is rather well formatted already. I think slightly more emphasis should be put on making a functioning program, but the class felt very smooth as is already.

- The weekly quizzes on material being discussed in class and only to key concepts of the weekly readings. Since all the assignments are group related this made sure every student did the weekly readings which kept my team prepared every week for the new material ahead.
- The emphasis on UML modeling is useless. The required text is useless, waterfall is not as widely used as before. Real companies are adopting agile teams.
- Git MUST be introduced BEFORE this course. The department is failing its students to not mention it before this course.
- The work given throughout the course was okay. The readings really helped us get to know different points and topics that affect software development and deployment like algorithmic accountability.
- It is a very valuable perspective for a current industry professional to come in and share practical experience about the software development cycle. More focus on practical knowledge could improve the program.
- The course failed in about every outcome. First, the course lacked lectures. No lecture ever lasted more than 15 minutes and after the second half of the course lectures were dropped altogether. After that class time was set up for teams to work on their project. But 90% the grade could be archive by writing a paper, so many students passed without writing a single line of code. Be familiar with the Software Development Life Cycle: I do not know Software Development Life Cycle stands for. Master the techniques to gather and specify the requirements of a medium-size software system using UML: The UML lecture did not last more than 15 minutes or about 2 slides. Then I was given a document which seemed to be taken from a Google Search. I don't know how to do UML. Master the techniques to design and implement a medium-size software system: I don't think it is possible to learn about how to implement medium-size software system if student could pass the class without writing code. Be familiar with software testing techniques: No resource about testing was ever shared. I was given a chart a "sample test cases". And I inferred what was testing was from that. If there was a lecture about this it did not last more than 15 minutes, and I can't recall those 15 minutes of my life. Be familiar with system walkthroughs: Never talk about nor asked about this. Be familiar with software documentation: Never talk about nor asked about this. Demonstrate the ability to communicate the details of the technical solution through verbal and written modes: Student were asked to do a presentation about their project, but it was not a technical presentation, not code of the system was really shown. It was more of a product showcase to a nontechnical audience. Moreover, for students who did not have a project could ramble about "Introduce the team including roles and responsibilities," "description of the customer/setting for the project," "Salient characteristics of the customer" etc. This downgraded the presentation to ENC 3213 presentation instead of CEN 4010 presentation. All in all, this felt like a technical writing class not a software engineering class. Suggestions: -Clear and objective descriptions of requirements and expectations. -Student should be graded on how well they can complete a project, the paper and presentation should be complementing not the main thing.

- **Observations and Recommendations:**

- Observations:
 - The irrelevance of Net-Centric course as one of the pre-requisites for this course is rightfully questioned by the instructor and students of the course.
 - There is a request for adding agile software development approaches to this course to better serve the senior project.
 - Lack of enough teamwork experience is evident in some cases. Our professors would like our students to perform better in their groups.
 - Lack of enough exposure to software development tools such as version control (e.g., git).
 - Our students expect to learn more about the real-world problems and the state-of-the-art software engineering practices being used in industry.
 - They do not want to be bugged down with plenty of homework assignments and extra documentations that would be of no use to them in the future.
- Recommendations:
 - Prerequisite and Preparedness
 - Net-Centric should be removed from the list of prerequisites for this course.
 - Opportunities for teamwork experience in prior courses should be explored.
 - Opportunities to expose students to software development tools such as version control should be explored in prior courses.
 - Agile and Scrum software development approaches should be included in the syllabus of this course.
 - State-of-the-art practices of software development from industry should be adopted in this course.
 - An Agile/Scrum textbook should be included as a reference, if not the main textbook of the course.
 - Class lecture times should be spent more on practicing agile software engineering development than just giving lectures.
 - Learning by example and practice is the best way to transfer the knowledge and experience from the professor to the students.

CEN 4021 – Software Engineering II

- **Summary of Assessment:**

This course was taught four times in the past two years. According to all the instructors of this course, the relevancy of the prerequisites was rated from useful to highly useful and mastery of the students was rated from adequate to good. Students’ preparedness was indicated as good or adequate.

| | | | | | | | |
|-----------------|----------------------|---------|----------------------------------|---------|---|-----------------------------|---------|
| CEN 4021 | Prerequisite | | | | | Student Preparedness | |
| | CEN 4010 | | | | | | |
| | SW Life Cycle | | Requirement Specification | | Software Design & Implementation | | |
| | Relevance | Mastery | Relevance | Mastery | Relevance | | Mastery |

| | | | | | | | |
|--------------------|---------------|----------|---------------|----------|---------------|----------|----------|
| Fall 2017 | Highly Useful | Adequate | Useful | Adequate | Useful | Adequate | Adequate |
| Spring 2018 | Highly Useful | Good | Highly Useful | Good | Highly Useful | Adequate | Good |
| Fall 2018 | Highly Useful | Good | Highly Useful | Good | Highly Useful | Good | Adequate |
| Spring 2019 | Highly Useful | Adequate | Highly Useful | Adequate | Useful | Adequate | Adequate |

According to the survey by 17 students, the average overall outcome is 4.92 out of 5 and the average coverage adequacy is 4.94 out of 5.

| CEN 4021 | # Responding | Overall Outcome | Coverage Adequacy |
|---------------------|---------------------|------------------------|--------------------------|
| Fall 2017 | 8 | 4.75 | 4.81 |
| Spring 2018 | 3 | 5 | 5 |
| Fall 2018 | 4 | 4.94 | 4.94 |
| Spring 2019 | 2 | 5 | 5 |
| Year 2017-19 | 17 | 4.9225 | 4.9375 |

Instructors' comments:

- The students were lacking knowledge in the area of modeling software artifacts using UML. The students lack the ability to create both static and dynamic UML models. They were also not proficient in the use of any UML modeling tool.
- More coverage on software design and software architecture.
- Deeper study in the SDLC

Students' comments:

- More guidance/specifics on what's required for the Deliverables would help.
- The class was very interesting and exposed the students to the software engineering process very well. However, the preparation for this course was nothing compared to the amount of work required from the class. It would have been better if Software Engineering 1 would have prepared the students better for this course in terms of UML use.
- This course has helped us tremendously by showing us the way the Software Engineering Industry works. All the different Panels were very important for learning from important aspect of Software Development from Software Architecture to Project Management. I'm very grateful I took this course and I believe it had a great impact in my professional life.

• Observations and Recommendations:

- The lack of UML knowledge is an indication that some professors might have not put enough emphasis on learning and practicing UML diagrams in CEN 4010 for the sake of adding some Agile/Scrum concepts. This should not be the case. Adding agile is a great improvement to CEN 4010, but it should not mean dropping the ball on the UML diagrams.

CEN 4072 – Software Testing & Verification

- **Summary of Assessment:**

This course was taught in every semester during the past two years. According to all the instructors of this course, the relevancy of the prerequisites was rated useful and mastery of the students was rated adequate. Students’ preparedness was indicated as adequate.

| CEN 4072 | Prerequisite | | Student Preparedness |
|-------------|--------------------------|----------|----------------------|
| | COP 3530 Data Structures | | |
| | Data Structures | | |
| | Relevance | Mastery | |
| Summer 2017 | Useful | Adequate | Adequate |
| Fall 2017 | Useful | Adequate | Adequate |
| Spring 2018 | Useful | Adequate | Adequate |
| Summer 2018 | Useful | Adequate | Adequate |
| Fall 2018 | Useful | Adequate | Adequate |
| Spring 2019 | Useful | Adequate | Adequate |

According to the survey by 42 students, the average overall outcome is 4.68 out of 5 and the average coverage adequacy is 4.40 out of 5.

| CEN 4072 | # Responding | Overall Outcome | Coverage Adequacy |
|--------------|--------------|-----------------|-------------------|
| Summer 2017 | 4 | 5 | 4.96 |
| Fall 2017 | 8 | 4.55 | 4.25 |
| Spring 2018 | 16 | 4.31 | 3.68 |
| Summer 2018 | 7 | 4.98 | 4.93 |
| Fall 2018 | 7 | 4.57 | 4.2 |
| Spring 2019 | ---- | ---- | ---- |
| Year 2017-19 | 42 | 4.682 | 4.404 |

Instructors’ comments:

- Students are lacking knowledge of some mathematical concepts that helps with test generation. For example, relations and equivalent classes.
- Students should be introduced to the concept of a server and manipulating the actions of the server.
- It is good to see that the Objective 6 - "Be exposed to program debugging", has been removed.
- Students lack some basic problem-solving skills such as drawing a flowchart for a single method and tracing the values passed to the method. This is a necessary skill for performing program inspections and code coverage.
- Students should be exposed to working in teams and team management before taking this course. Assuming this is possible with the curriculum.
- Some students expect to be spoon-fed and are not willing to use the wide array of resources available to learn how to use the various testing tools. In addition, some students wait until the last minute to start a project that is way too complex to complete in one or two days.

Students' comments:

- Use new tools used by more companies such as selenium instead of RFT.
- Some examples on how to use testing tools would be nice. Online resources were not helpful.
- The board work was useful for teaching the written problems for this course. More hands-on experience with the testing tools would have been worthwhile, rather than letting it be free range. Summary of important material was handled well.
- I understand that we are this late into our major and that we should be able to figure how things work. However, it would be good if the usage of the actual tools is taught instead of teaching some of the theoretical concepts of software testing. It would be easier to do the actual testing.
- There need to be more recourses for setting the testing software up given at the beginning of the course.
- This course would be no less effectively if it did not require a textbook.
- Suggest students not to take it earlier or after software engineering. Many concepts are needed that build into for this course
- To improve, there should be formal tutorials that address the possible problem one may encounter while trying to set up IBM RFT. and Cobertura. From my experience with the class, one can easily waste 50 to 80 hours trying to set up that 2 software. Imagine how much efficient a student would be in testing and getting code coverage if he/she didn't have to waste so much time on those. That's why those tutorials should be considered since they are most needed resources.
- Please consider recording classes, for those that miss it, in order to catch up.
- Class had some components that were never taught in previous classes.

• **Observations and Recommendations:**

- To bring the syllabus of this course up to speed with the state-of-the-art practices in industry, test-driven development is one of the popular agile software development practices in industry. Students should be exposed to this approach.
- Debugging should stay in the syllabus as testing without debugging would not help with improving the quality of the software solution.
- To give students some hands-on experience, a good portion of the lectures time should be spent more on practicing the testing/debugging methods using state-of-the-art tools. Alternatively, some online tutorials can be suggested to the students to do some self-learning.

COP 4911 and IDS 4918 – Senior Project

• **Summary of Assessment:**

This course was taught in every semester during the past two years. According to the instructor of this course, the relevancy of the prerequisites was rated from useful to highly useful and mastery of the students was rated adequate. Students' preparedness was indicated as adequate.

| | | |
|----------|--------------|--|
| CIS 4911 | Prerequisite | |
|----------|--------------|--|

| | CEN 4010 | | | | Student Preparedness |
|--------------------|------------------------|----------------|--------------------------|----------------|-----------------------------|
| | SW Dev. Process | | Basic PM Concepts | | |
| | Relevance | Mastery | Relevance | Mastery | |
| Summer 2017 | Highly Useful | Adequate | Useful | Adequate | Adequate |
| Fall 2017 | Highly Useful | Adequate | Useful | Adequate | Adequate |
| Spring 2018 | Highly Useful | Adequate | Useful | Adequate | Adequate |
| Summer 2018 | Highly Useful | Adequate | Useful | Adequate | Adequate |
| Fall 2018 | Highly Useful | Adequate | Useful | Adequate | Adequate |
| Spring 2019 | Highly Useful | Adequate | Useful | Adequate | Adequate |

According to the survey by 90 students, the average overall outcome is 4.70 out of 5 and the average coverage adequacy is 4.20 out of 5.

| CIS 4911 | # Responding | Overall Outcome | Coverage Adequacy |
|---------------------|---------------------|------------------------|--------------------------|
| Summer 2017 | 31 | 4.67 | 4.5 |
| Fall 2017 | 21 | 4.78 | 4.33 |
| Spring 2018 | 11 | 4.73 | 4.19 |
| Summer 2018 | 2 | 4.73 | 4.09 |
| Fall 2018 | 16 | 4.56 | 3.67 |
| Spring 2019 | 9 | 4.72 | 4.44 |
| Year 2017-19 | 90 | 4.698333333 | 4.203333333 |

Instructors' comments:

- CEN 4010 should include Agile/Scrum software development in its syllabus to better prepare students for this course.

Students' comments:

- Perhaps try to get one or two more sprints in the summer.
- It was fine, just need a way to help when teammates drop course.
- It is a bit confusing when starting the project; therefore, I recommend having clearer instructions on what to do at the beginning of the senior project semester.
- Make Product Owners formally agree to be available as per our scheduled work times, there were cases where product owners were not always available for Sprint Review meetings or Planning.
- More guidance during the process would have been very helpful. I think we did not have a mentor that would have fulfilled the role.
- Most projects focused on web development. It would have been nice to have been given a heads-up earlier in my academic career. Also, for students like me who provide for their own living the work and school life balance are rough.
- Please let students pick their own project ideas. You can have certain minimum requirements that they must meet, but it would be great if they idea was theirs. I had a great idea for an application I wanted to do for senior, but I did not get the chance because of the current way things are.
- Only real complaint was when asking about UML diagrams / documentation, was told that I should have "learned that already". I HAD learned about UML already, but

a lot of the rules are poorly defined, and, in my experience, different graders have different preferences for what is "correct".

- I think that the previous student, should left comment on the different thing to change, and the new feature that could be a good thing to work on.
- Should focus agile in software engineering and provide some web development classes
- I wish it was more structured, but it's a senior capstone course so I guess I can't really ask for that.
- Needed more time. Lost a week in the beginning of an already short semester.
- Give a little more information background on what the project is that we are working on. The old resources were very difficult to find.
- Better communication of expectations at the beginning of the semester (i.e. documentation).
- More mandatory contact with instructor.
- Less documentation. In industry, class diagrams are sequence diagrams are barely ever used.
- Information needs to be organized for this course; everything needs to be in one place. Some info is on Moodle, some is on the schedule, and some is on google drive. There is no reason why you have to check 3 or 4 different locations to be find the complete instructions for a single deliverable.
- I believe what this course needs are mandatory weekly meetings were us students can receive meaningful input from both the professors and other fellow students so that it isn't an all on your own type of class, where the only communication that occurs is over email.
- No feedback was given besides "looks good".
- Not very organized, conflicting documentation, no knowledge of class performance throughout the semester. Need to give students a week to look at the project list to allow them to thoroughly look through the projects they desire to join.
- It was a struggle to figure out what was due when and with what requirements. The professor demanded strict adherence to his instructions which were often unclear or conflicting with things posted online. This class would benefit greatly from a calendar with all requirements posted accurately.
- Get a project management system that works. The servers went down at least once per sprint for 1-2 days at a time. One instance caused all teams to lose days' worth of work. Documentation requirements were vague and were often amended 1 day before deadlines.
- While the execution of this type of course is essential to a student's ability to fully grasp the software engineering process, I do feel there is a great deal of disconnect between the courses we are required to take prior and the practical application of that knowledge.
- I strongly believe there could be other courses on the computer science curriculum that can benefit the preparation and skills needed for the senior project. For example, a course that goes in depth on client and server-side applications, maybe some projects that simulate scalability, etc... But either way, I enjoyed the senior project

class. The large amount of documentation is a bit excessive in my opinion but all together I find the class great.

- This was the first semester that we used JIRA. There was a learning curve at the beginning but became easier to use as the semester progressed. Confluence was down a couple of times when deliverables were due, I assume it was because everyone was trying to use it at the same time. So, that should be addressed moving forward. Also, if JIRA is to be used in future semesters it would be beneficial if students had the opportunity to use it in Software Engineering Course beforehand. That way the transition is seamless into Senior Project. Finally, in the beginning of the semester when projects are picked, it would be nice if the product owners did a presentation for the entire class showcasing the previous semesters work and what they want moving forward. That way students are a bit more informed when picking a project for the rest of the semester.
- The material was sparsely relevant to my career and the relevant components were rehashed straight from the Software Engineering course we're required to take right before this class. 8) I think the organization of documentation and using jira/confluence was very confusing. There was differing information.
- understand the class is about Agile development and adapting to change, but as someone who has worked in the field for the last two years, I actually do not use most of the tactics this course is supposed to teach us. In fact, I found it quite cumbersome. There should be less of a focus on the documentation and more on actual development. I understand students can develop bad habits with their first introduction to full-stack development, but it is the only course offered by FIU (aside from CEN4072 - Fundamentals of Software testing) that actually gives us a look into real life scenarios and delivering a tangible artifact to the customer.
- We don't get enough preparation in the career to work in the final project. If you don't work in a real project, then you don't have enough preparation to work in a project like the ones in the Senior Project
- Course is the best experience in college. I work at an enterprise level and there is nothing like what areal software engineer job is than this course.
- **Observations and Recommendations:**
 - Students should be better prepared for this class.
 - Add Agile/Scrum software development approaches to CEN 4010. Also, they should learn and experience how to be a good team member in a self-organizing Agile/Scrum development team.
 - Adding Agile to the syllabus of CEN 4010 should NOT mean that learning of UML diagrams should be dropped or taken lightly. Our students must know how to read/create the most popular UML diagrams. Unfortunately, this is not the case for many of our students.
 - Provide students with a compressed Agile/Scrum online training at the beginning of the semester so that those of them who are lacking some knowledge in this area can catch up before the work on their senior projects starts.

- An eligibility test should be taken at the beginning of the semester so that students are well prepared to perform in a project. This would avoid issues with their teammates during the semester.
- The product owners should be better prepared for this class.
 - The product owners of approved projects must go through a short crash course on how to be a good product owner for our students.
 - They must commit to be available to answer our students' questions daily and be available to review/evaluate their work every other week and provide them with enough work for the following sprints ahead of time.
- Expectations from the students should be clearly communicated to them.
 - The instructor of the class must provide clear breakdown of the points and provide students with bi-weekly updates on their status.
 - More in-depth feedback should be provided to the students both by the product owner and the instructor of the class on an ongoing basis and when requested specifically by the students.
 - All the requirements and guidance for the class should be easily accessible by the students. Even if some requirements and guidance may be required to be in different systems, there must be one starting point from which everything is accessible.
- Need for professional system staff support.
 - The project management tools adopted for this class in some cases had been hacked and the server went down.
 - There should be one or more system staff at SCIS assigned to this course to manage the support software tools for the students.

Subject Area: Computer Systems

Jason Liu

Duration: Summer 2017 to Spring 2019

CAP 4612 Introduction to Machine Learning

CAP 4710 Principles of Computer Graphics

CAP 4770 Introduction to Data Mining

CEN 4083 Cloud Computing

COP 4604 Advanced UNIX Programming

COP 4710 Database Management

COP 4722 Survey of Database Systems

CAP 4612 Introduction to Machine Learning

- *The course has not been offered during this period.*

CAP 4710 Principles of Computer Graphics

- *Appraisal and Course Evaluation Reports Status: This course was taught only once by one instructor during this period. The instructor did not submit the course appraisals for the session. The student evaluation for the session (only one evaluation received) is available in the system.*
- *Summary of Assessment: This course has eight outcomes.*
- *Recommendation: I recommend no changes to the outcome of this course.*
- *The following table shows a summary of the student evaluation:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-------------|---------|--------------|---------------|-------------------|
| Spring 2019 | U01 | 1 | 4.88 | 4.12 |

CAP 4770 Introduction to Data Mining

- *Appraisal and Course Evaluation Reports Status: This course was taught five times by the same instructor during this period. The instructor submitted the course appraisals for all the sessions. The student evaluations are also available in the system.*
- *Summary of Assessment: This course has six outcomes, all of which have been indicated by the instructor as either essential or appropriate.*
- *Recommendation: I recommend no changes to the outcome of this course.*
- *The following table shows a summary of the student evaluations:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-------------|---------|--------------|---------------|-------------------|
| Fall 2017 | RVC | 10 | 4.93 | 4.75 |
| Spring 2018 | RVC | 12 | 4.9 | 4.35 |
| Summer 2018 | RVAA | 6 | 5 | 4.94 |
| Fall 2018 | RVC | 3 | 4.44 | 4 |
| Spring 2019 | RVC | 5 | 5 | 4.8 |

CEN 4083 Cloud Computing

- *Appraisal and Course Evaluation Reports Status: This course was taught one time by one instructor during this period. The instructor submitted the course appraisal for this course. The student evaluations are also available in the system.*
- *Summary of Assessment: This course has four outcomes, all of which have been indicated by the instructor as essential.*
- *Recommendation: I recommend no changes to the outcome of this course.*
- *The following table shows a summary of the student evaluations:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-----------|---------|--------------|---------------|-------------------|
| Fall 2018 | U01 | 2 | 3.88 | 3.25 |

COP 4604 Advanced Unix Programing

- *Appraisal and Course Evaluation Reports Status: This course was taught once by one instructor during this period. The instructor didn't submit the course appraisal for this session. The student evaluation for this session (only one evaluation received) is available in the system.*
- *Summary of Assessment: This course has six outcomes, all of which have been indicated by the instructor as essential or appropriate.*
- *Recommendation: I recommend no changes to the outcome of this course.*
- *The following table shows a summary of the student evaluations:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-------------|---------|--------------|---------------|-------------------|
| Summer 2017 | U01C | 1 | NA | NA |

COP 4710 Database Management

- *Appraisal and Course Evaluation Reports Status: This course was taught in seventeen sessions of classes by four instructors during this period. The instructors have submitted all of the course appraisals for all the sessions. The student evaluation for all of sessions is available in the system.*
- *Summary of Assessment: This course has seven outcomes, all of which have been indicated by the instructors as either essential or appropriate.*
- *Recommendation: I recommend no changes to the outcome of this course.*
- *The following table shows a summary of the student evaluations:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-------------|---------|--------------|---------------|-------------------|
| Summer 2017 | U01A | 1 | 4.71 | 4.86 |
| Fall 2017 | U01 | 9 | 4.86 | 4.84 |
| Fall 2017 | RVC | 9 | 4.67 | 3.6 |
| Fall 2017 | U03 | 6 | 4.62 | 4.24 |
| Spring 2018 | U01 | 15 | 4.99 | 4.9 |

| | | | | |
|-------------|------|----|------|------|
| Spring 2018 | U02 | 3 | 4.71 | 4.24 |
| Spring 2018 | U03 | 2 | 4.43 | 4.43 |
| Spring 2018 | RVC | 10 | 4.89 | 4.59 |
| Summer 2018 | U01B | 4 | 4.68 | 4.79 |
| Fall 2018 | U01 | 1 | 4.86 | 4.86 |
| Fall 2018 | U02 | 3 | 4.9 | 4.95 |
| Fall 2018 | U03 | 1 | 3.86 | 3.86 |
| Fall 2018 | RVC | 4 | 4.82 | 4.79 |
| Spring 2019 | U01 | 1 | 5 | 5 |
| Spring 2019 | U02 | NA | NA | NA |
| Spring 2019 | U03 | 3 | 4.95 | 4.95 |
| Spring 2019 | RVC | 3 | 3.57 | 1.67 |

COP 4722 Survey of Database Systems

- *Appraisal and Course Evaluation Reports Status: This course was taught twelve times by two instructors during this period. The instructor has submitted all of the course appraisals for all the sessions. The student evaluations for sessions are available in the system.*
- *Summary of Assessment: This course has five outcomes. One instructor indicated that all the outcomes as essential, very appropriate, or appropriate. However, another instructor consistently indicated that the objective “Object-Oriented Database” and “Spatial and Multimedia Databases” as inappropriate.*
- *Recommendation: I recommend the two outcomes of this course need to be discussed and possibly readjusted.*
- *The following table shows a summary of the student evaluations:*

| Semester | Session | # Responding | Outcome Value | Coverage Adequacy |
|-------------|---------|--------------|---------------|-------------------|
| Summer 2017 | RVAA | NA | NA | NA |
| Fall 2017 | UHA | 5 | 4.88 | 3.84 |
| Fall 2017 | RVC | 8 | 4.22 | 4.18 |
| Spring 2018 | UHA | 5 | 3.84 | 3.32 |
| Spring 2018 | UHB | 2 | 5 | 5 |
| Spring 2018 | RVC | 10 | 4.22 | 3.66 |
| Summer 2018 | RVAA | 3 | 5 | 4.27 |
| Fall 2018 | UHA | 5 | 4.44 | 3.52 |
| Fall 2018 | RVC | 1 | 5 | 5 |
| Spring 2019 | UHA | 1 | 5 | 4.8 |
| Spring 2019 | NA | NA | NA | NA |
| Spring 2019 | RVC | 2 | 5 | 5 |

APPENDIX D-1: Exit (Graduating Student) Survey

Raw Data and Statistics for Individual Semesters

The raw data for individual semesters are presented here along with statistical calculations. The aggregate data for five semesters from Summer 2017 to Spring 2019 (Summer 2018 data was not collected) along with aggregate statistical results are included below.

| | | | | | | | | | | |
|---|-----------------------------------|---|---|----------------|--------------|--------------|------------------|---------------|-----------|---------|
| | | | SUMMER 2017 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | TOTAL | NUMBER OF | AVERAGE |
| PROGRAM EDUCATIONA L OBJECTIVE | SCORES - # OF STUDENTS RESPONDING | | | | | | WEIG HTED | RESPO NSES | SCOR E | |
| | | | Agre e | Agree | Agree | Disag ree | Disagre e | Disa gree | SCOR E | |
| | | | Stro ngly | Moder ately | Some what | Some what | Modera tively | Stro ngly | | |
| | | | 5 | 4 | 3 | 2 | 1 | 0 | | |
| | | | | | | | | | | |
| Proficiency in Foundation Areas of Computer Science | | | | | | | | | | |
| Outcome has been met for me personally | 18 | 7 | 0 | 0 | 0 | 0 | 0 | 118 | 25 | 4.72 |
| How meaningful the outcome is for me personally | 18 | 6 | 1 | 0 | 0 | 0 | 0 | 117 | 25 | 4.68 |
| | | | | | | | | | | |
| Proficiency in Core Areas of Computer Science | | | | | | | | | | |
| Outcome has been met for me personally | 20 | 4 | 1 | 0 | 0 | 0 | 0 | 119 | 25 | 4.76 |
| How meaningful the outcome is for me personally | 21 | 3 | 1 | 0 | 0 | 0 | 0 | 120 | 25 | 4.80 |
| | | | | | | | | | | |
| Proficiency in Problem Solving | | | | | | | | | | |

| | | | | | | | | | |
|---|----|---|---|---|---|---|-----|----|------|
| Outcome has been met for me personally | 19 | 3 | 3 | 0 | 0 | 0 | 116 | 25 | 4.64 |
| How meaningful the outcome is for me personally | 24 | 0 | 1 | 0 | 0 | 0 | 123 | 25 | 4.92 |
| | | | | | | | | | |
| Proficiency in Programming Language | | | | | | | | | |
| Outcome has been met for me personally | 14 | 5 | 4 | 0 | 1 | 1 | 103 | 25 | 4.12 |
| How meaningful the outcome is for me personally | 20 | 4 | 1 | 0 | 0 | 0 | 119 | 25 | 4.76 |
| | | | | | | | | | |
| Understanding of Social and Ethical Issues | | | | | | | | | |
| Outcome has been met for me personally | 11 | 8 | 6 | 0 | 0 | 0 | 105 | 25 | 4.20 |
| How meaningful the outcome is for me personally | 11 | 5 | 6 | 3 | 0 | 0 | 99 | 25 | 3.96 |
| | | | | | | | | | |
| Ability to Work Cooperatively in Teams | | | | | | | | | |
| Outcome has been met for me personally | 19 | 3 | 1 | 2 | 0 | 0 | 114 | 25 | 4.56 |
| How meaningful the outcome is for me personally | 20 | 1 | 4 | 0 | 0 | 0 | 116 | 25 | 4.64 |
| | | | | | | | | | |
| Demonstrate Effective | | | | | | | | | |

| | | | | | | | | | |
|---|----|---|---|---|---|---|-----|----|------|
| Communication Skills | | | | | | | | | |
| Outcome has been met for me personally | 15 | 7 | 3 | 0 | 0 | 0 | 112 | 25 | 4.48 |
| How meaningful the outcome is for me personally | 20 | 4 | 1 | 0 | 0 | 0 | 119 | 25 | 4.76 |
| | | | | | | | | | |
| Experience with Contemporary Environments and Tools | | | | | | | | | |
| Outcome has been met for me personally | 12 | 2 | 8 | 2 | 0 | 1 | 96 | 25 | 3.84 |
| How meaningful the outcome is for me personally | 22 | 0 | 3 | 0 | 0 | 0 | 119 | 25 | 4.76 |

| | | | | | | | | | | | |
|---|--|--|--|----------|-----------|-----------|------------|-----------------|------------------|--------------|------|
| | | | FALL 2017 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | TOTAL | NUMBER OF | AVERAGE | |
| STUDENT OUTCOMES FOR BS IN CS PROGRAM | | | SCORES - # OF STUDENTS RESPONDING | | | | | WEIGHTED | RESPONSES | SCORE | |
| | | | Agree | Agree | Agree | Disagree | Disagree | Disagree | SCORE | | |
| | | | Strongly | Modestly | Some what | Some what | Moderately | Strongly | | | |
| | | | 5 | 4 | 3 | 2 | 1 | 0 | | | |
| Ability to apply knowledge of computing and mathematics | | | | | | | | | | | |
| Outcome has been met for me personally | | | 31 | 13 | 2 | 2 | 0 | 0 | 217 | 48 | 4.52 |
| How meaningful the outcome is for me personally | | | 35 | 11 | 1 | 0 | 1 | 0 | 223 | 48 | 4.65 |
| Ability to analyze problem - identify and define its computing requirements | | | | | | | | | | | |
| Outcome has been met for me personally | | | 34 | 11 | 2 | 0 | 1 | 0 | 221 | 48 | 4.60 |
| How meaningful the outcome is for me personally | | | 42 | 6 | 0 | 0 | 0 | 0 | 234 | 48 | 4.88 |
| Ability to design, implement, and evaluate a computer-based system | | | | | | | | | | | |
| Outcome has been met for me personally | | | 34 | 11 | 2 | 0 | 1 | 0 | 221 | 48 | 4.60 |

| | | | | | | | | | |
|--|----|----|---|---|---|---|-----|----|------|
| How meaningful the outcome is for me personally | 40 | 8 | 0 | 0 | 0 | 0 | 232 | 48 | 4.83 |
| | | | | | | | | | |
| Ability to function effectively on teams to accomplish a common goal | | | | | | | | | |
| Outcome has been met for me personally | 37 | 6 | 4 | 0 | 0 | 1 | 221 | 48 | 4.60 |
| How meaningful the outcome is for me personally | 41 | 7 | 0 | 0 | 0 | 0 | 233 | 48 | 4.85 |
| | | | | | | | | | |
| Understanding of professional, ethical, legal, security, and social issues | | | | | | | | | |
| Outcome has been met for me personally | 30 | 11 | 6 | 1 | 0 | 0 | 214 | 48 | 4.46 |
| How meaningful the outcome is for me personally | 30 | 15 | 3 | 0 | 0 | 0 | 219 | 48 | 4.56 |
| | | | | | | | | | |
| Ability to communicate effectively with a range of audiences | | | | | | | | | |
| Outcome has been met for me personally | 30 | 15 | 2 | 1 | 0 | 0 | 218 | 48 | 4.54 |
| How meaningful the outcome is for me personally | 39 | 7 | 2 | 0 | 0 | 0 | 229 | 48 | 4.77 |
| | | | | | | | | | |
| Ability to analyze local and global impact of computing on society | | | | | | | | | |
| Outcome has been met for me personally | 27 | 13 | 7 | 0 | 1 | 0 | 209 | 48 | 4.35 |
| How meaningful the outcome is for me personally | 30 | 13 | 3 | 2 | 0 | 0 | 215 | 48 | 4.48 |
| | | | | | | | | | |

| | | | | | | | | | |
|--|----|----|---|---|---|---|-----|----|------|
| Recognition of the need for and an ability to engage in continuing professional development | | | | | | | | | |
| Outcome has been met for me personally | 29 | 13 | 5 | 1 | 0 | 0 | 214 | 48 | 4.46 |
| How meaningful the outcome is for me personally | 40 | 6 | 2 | 0 | 0 | 0 | 230 | 48 | 4.79 |
| | | | | | | | | | |
| Ability to use current techniques, skills, and tools necessary for computing practice | | | | | | | | | |
| Outcome has been met for me personally | 29 | 12 | 6 | 1 | 0 | 0 | 213 | 48 | 4.44 |
| How meaningful the outcome is for me personally | 38 | 7 | 3 | 0 | 0 | 0 | 227 | 48 | 4.73 |
| | | | | | | | | | |
| Ability to apply mathematical foundations and algorithmic principles in design of computer systems | | | | | | | | | |
| Outcome has been met for me personally | 29 | 17 | 1 | 1 | 0 | 0 | 218 | 48 | 4.54 |
| How meaningful the outcome is for me personally | 34 | 9 | 4 | 0 | 1 | 0 | 219 | 48 | 4.56 |
| | | | | | | | | | |
| Ability to apply design and development principles to construct complex software systems | | | | | | | | | |
| Outcome has been met for me personally | 32 | 11 | 4 | 0 | 0 | 1 | 216 | 48 | 4.50 |

| | | | | | | | | | |
|---|----|---|---|---|---|---|-----|----|------|
| How meaningful the outcome is for me personally | 39 | 9 | 0 | 0 | 0 | 0 | 231 | 48 | 4.81 |
|---|----|---|---|---|---|---|-----|----|------|

| | | | | | | | | | | | |
|---|--|--|--|-----------------|--------------|--------------|-----------------|-----------|-----------|---------|------|
| | | | SPRING 2018 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | TOTAL | NUMBER OF | AVERAGE | |
| STUDENT OUTCOMES FOR BS IN CS PROGRAM | | | SCORES - # OF STUDENTS RESPONDING | | | | WEIGHTED | RESPONSES | SCORE | | |
| | | | Agree | Agree | Agree | Disagree | Disagree | Disagree | SCORE | | |
| | | | Strongly | Mod- erately | Some what | Some what | Moder- ately | Strongly | | | |
| | | | 5 | 4 | 3 | 2 | 1 | 0 | | | |
| Ability to apply knowledge of computing and mathematics | | | | | | | | | | | |
| Outcome has been met for me personally | | | 8 | 12 | 1 | 0 | 0 | 0 | 91 | 21 | 4.33 |
| How meaningful the outcome is for me personally | | | 10 | 8 | 1 | 1 | 0 | 0 | 87 | 20 | 4.35 |
| Ability to analyze problem - identify and define its computing requirements | | | | | | | | | | | |
| Outcome has been met for me personally | | | 10 | 9 | 1 | 1 | 0 | 0 | 91 | 21 | 4.33 |
| How meaningful the outcome is for me personally | | | 19 | 2 | 0 | 0 | 0 | 0 | 103 | 21 | 4.90 |
| Ability to design, implement, and | | | | | | | | | | | |

| | | | | | | | | | |
|--|----|---|---|---|---|---|----|----|------|
| evaluate a computer-based system | | | | | | | | | |
| Outcome has been met for me personally | 11 | 3 | 5 | 1 | 0 | 0 | 84 | 20 | 4.20 |
| How meaningful the outcome is for me personally | 17 | 3 | 0 | 0 | 0 | 0 | 97 | 20 | 4.85 |
| | | | | | | | | | |
| Ability to function effectively on teams to accomplish a common goal | | | | | | | | | |
| Outcome has been met for me personally | 12 | 5 | 3 | 0 | 0 | 0 | 89 | 20 | 4.45 |
| How meaningful the outcome is for me personally | 18 | 2 | 0 | 0 | 0 | 0 | 98 | 20 | 4.90 |
| | | | | | | | | | |
| Understanding of professional, ethical, legal, security, and social issues | | | | | | | | | |
| Outcome has been met for me personally | 13 | 5 | 1 | 0 | 0 | 1 | 88 | 20 | 4.40 |
| How meaningful the outcome is for me personally | 14 | 4 | 2 | 0 | 0 | 0 | 92 | 20 | 4.60 |
| | | | | | | | | | |
| Ability to communicate effectively with a range of audiences | | | | | | | | | |
| Outcome has been met for me personally | 13 | 6 | 1 | 0 | 0 | 0 | 92 | 20 | 4.60 |
| How meaningful the outcome is for me personally | 16 | 2 | 2 | 0 | 0 | 0 | 94 | 20 | 4.70 |
| | | | | | | | | | |
| Ability to analyze local and global impact of computing on society | | | | | | | | | |
| Outcome has been met for me personally | 10 | 6 | 3 | 0 | 1 | 0 | 84 | 20 | 4.20 |

| | | | | | | | | | |
|--|----|---|---|---|---|---|----|----|------|
| How meaningful the outcome is for me personally | 12 | 5 | 2 | 1 | 0 | 0 | 88 | 20 | 4.40 |
| | | | | | | | | | |
| Recognition of the need for and an ability to engage in continuing professional development | | | | | | | | | |
| Outcome has been met for me personally | 10 | 8 | 1 | 0 | 1 | 0 | 86 | 20 | 4.30 |
| How meaningful the outcome is for me personally | 16 | 3 | 1 | 0 | 0 | 0 | 95 | 20 | 4.75 |
| | | | | | | | | | |
| Ability to use current techniques, skills, and tools necessary for computing practice | | | | | | | | | |
| Outcome has been met for me personally | 5 | 8 | 4 | 2 | 0 | 0 | 73 | 19 | 3.84 |
| How meaningful the outcome is for me personally | 17 | 2 | 0 | 0 | 0 | 0 | 93 | 19 | 4.89 |
| | | | | | | | | | |
| Ability to apply mathematical foundations and algorithmic principles in design of computer systems | | | | | | | | | |
| Outcome has been met for me personally | 9 | 7 | 2 | 0 | 0 | 0 | 79 | 18 | 4.39 |
| How meaningful the outcome is for me personally | 12 | 5 | 1 | 0 | 0 | 0 | 83 | 18 | 4.61 |
| | | | | | | | | | |
| Ability to apply design and development principles to construct complex software systems | | | | | | | | | |

| | | | | | | | | | |
|---|----|---|---|---|---|---|----|----|------|
| Outcome has been met for me personally | 10 | 6 | 1 | 0 | 1 | 0 | 78 | 18 | 4.33 |
| How meaningful the outcome is for me personally | 15 | 2 | 0 | 0 | 0 | 1 | 83 | 18 | 4.61 |

| | | | | | | | | | | | |
|---|--|--|---|-------------|-----------|-----------|-------------|-----------|-----------|---------|------|
| | | | FALL 2018 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | TOTAL | NUMBER OF | AVERAGE | |
| STUDENT OUTCOMES FOR BS IN CS PROGRAM | | | SCORES - # OF STUDENTS RESPONDING | | | | | WEIGHTED | RESPONSES | SCORE | |
| | | | Agree | Agree | Agree | Disagree | Disagree | Disagree | SCORE | | |
| | | | Strongly | Mod-erately | Some-what | Some-what | Moder-ately | Stro-ngly | | | |
| | | | 5 | 4 | 3 | 2 | 1 | 0 | | | |
| Ability to apply knowledge of computing and mathematics | | | | | | | | | | | |
| Outcome has been met for me personally | | | 3 | 5 | 0 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | | | 7 | 1 | 0 | 0 | 0 | 0 | 39 | 8 | 4.88 |
| Ability to analyze problem - identify and define its computing requirements | | | | | | | | | | | |
| Outcome has been met for me personally | | | 4 | 2 | 2 | 0 | 0 | 0 | 34 | 8 | 4.25 |
| How meaningful the outcome is for me personally | | | 7 | 1 | 0 | 0 | 0 | 0 | 39 | 8 | 4.88 |
| Ability to design, implement, and evaluate a computer-based system | | | | | | | | | | | |
| Outcome has been met for me personally | | | 2 | 4 | 2 | 0 | 0 | 0 | 32 | 8 | 4.00 |

| | | | | | | | | | |
|--|---|---|---|---|---|---|----|---|------|
| How meaningful the outcome is for me personally | 8 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 5.00 |
| | | | | | | | | | |
| Ability to function effectively on teams to accomplish a common goal | | | | | | | | | |
| Outcome has been met for me personally | 6 | 1 | 1 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| How meaningful the outcome is for me personally | 6 | 1 | 1 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| | | | | | | | | | |
| Understanding of professional, ethical, legal, security, and social issues | | | | | | | | | |
| Outcome has been met for me personally | 4 | 3 | 1 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | 4 | 3 | 0 | 1 | 0 | 0 | 34 | 8 | 4.25 |
| | | | | | | | | | |
| Ability to communicate effectively with a range of audiences | | | | | | | | | |
| Outcome has been met for me personally | 3 | 5 | 0 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | 5 | 2 | 1 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| | | | | | | | | | |
| Ability to analyze local and global impact of computing on society | | | | | | | | | |
| Outcome has been met for me personally | 5 | 2 | 1 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| How meaningful the outcome is for me personally | 3 | 2 | 3 | 0 | 0 | 0 | 32 | 8 | 4.00 |
| | | | | | | | | | |

| | | | | | | | | | |
|--|---|---|---|---|---|---|----|---|------|
| Recognition of the need for and an ability to engage in continuing professional development | | | | | | | | | |
| Outcome has been met for me personally | 6 | 1 | 1 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| How meaningful the outcome is for me personally | 6 | 2 | 0 | 0 | 0 | 0 | 38 | 8 | 4.75 |
| | | | | | | | | | |
| Ability to use current techniques, skills, and tools necessary for computing practice | | | | | | | | | |
| Outcome has been met for me personally | 3 | 4 | 1 | 0 | 0 | 0 | 34 | 8 | 4.25 |
| How meaningful the outcome is for me personally | 7 | 1 | 0 | 0 | 0 | 0 | 39 | 8 | 4.88 |
| | | | | | | | | | |
| Ability to apply mathematical foundations and algorithmic principles in design of computer systems | | | | | | | | | |
| Outcome has been met for me personally | 3 | 4 | 1 | 0 | 0 | 0 | 34 | 8 | 4.25 |
| How meaningful the outcome is for me personally | 8 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 5.00 |
| | | | | | | | | | |
| Ability to apply design and development principles to construct complex software systems | | | | | | | | | |
| Outcome has been met for me personally | 3 | 2 | 3 | 0 | 0 | 0 | 32 | 8 | 4.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|----|---|------|
| How meaningful the outcome is for me personally | 6 | 2 | 0 | 0 | 0 | 0 | 38 | 8 | 4.75 |
|---|---|---|---|---|---|---|----|---|------|

| | | | | | | | | | | | |
|---|--|--|--|-------------|-----------|-----------|-------------|-----------|-----------|-----------|---------|
| | | | SPRING 2019 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | TOTAL | NUMBER OF | AVERAGE |
| STUDENT OUTCOMES FOR BS IN CS PROGRAM | | | SCORES - # OF STUDENTS RESPONDING | | | | | WEIGHTED | RESPONSES | SCORE | |
| | | | Agree | Agree | Agree | Disagree | Disagree | Disagree | SCORE | | |
| | | | Strongly | Mod-erately | Some-what | Some-what | Moder-ately | Stro-ngly | | | |
| | | | 5 | 4 | 3 | 2 | 1 | 0 | | | |
| Ability to apply knowledge of computing and mathematics | | | | | | | | | | | |
| Outcome has been met for me personally | | | 5 | 3 | 0 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| How meaningful the outcome is for me personally | | | 7 | 1 | 0 | 0 | 0 | 0 | 39 | 8 | 4.88 |
| Ability to analyze problem - identify and define its computing requirements | | | | | | | | | | | |
| Outcome has been met for me personally | | | 5 | 3 | 0 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| How meaningful the outcome is for me personally | | | 7 | 1 | 0 | 0 | 0 | 0 | 39 | 8 | 4.88 |
| Ability to design, implement, and evaluate a computer-based system | | | | | | | | | | | |

| | | | | | | | | | |
|--|---|---|---|---|---|---|----|---|------|
| Outcome has been met for me personally | 4 | 4 | 0 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| How meaningful the outcome is for me personally | 5 | 3 | 0 | 0 | 0 | 0 | 37 | 8 | 4.63 |
| Ability to function effectively on teams to accomplish a common goal | | | | | | | | | |
| Outcome has been met for me personally | 4 | 2 | 2 | 0 | 0 | 0 | 34 | 8 | 4.25 |
| How meaningful the outcome is for me personally | 5 | 2 | 1 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| Understanding of professional, ethical, legal, security, and social issues | | | | | | | | | |
| Outcome has been met for me personally | 2 | 4 | 2 | 0 | 0 | 0 | 32 | 8 | 4.00 |
| How meaningful the outcome is for me personally | 3 | 2 | 3 | 0 | 0 | 0 | 32 | 8 | 4.00 |
| Ability to communicate effectively with a range of audiences | | | | | | | | | |
| Outcome has been met for me personally | 3 | 5 | 0 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | 4 | 4 | 0 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| Ability to analyze local and global impact of computing on society | | | | | | | | | |
| Outcome has been met for me personally | 2 | 5 | 1 | 0 | 0 | 0 | 33 | 8 | 4.13 |

| | | | | | | | | | |
|--|---|---|---|---|---|---|----|---|------|
| How meaningful the outcome is for me personally | 2 | 2 | 4 | 0 | 0 | 0 | 30 | 8 | 3.75 |
| | | | | | | | | | |
| Recognition of the need for and an ability to engage in continuing professional development | | | | | | | | | |
| Outcome has been met for me personally | 4 | 3 | 1 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | 4 | 4 | 0 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| | | | | | | | | | |
| Ability to use current techniques, skills, and tools necessary for computing practice | | | | | | | | | |
| Outcome has been met for me personally | 4 | 4 | 0 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| How meaningful the outcome is for me personally | 6 | 2 | 0 | 0 | 0 | 0 | 38 | 8 | 4.75 |
| | | | | | | | | | |
| Ability to apply mathematical foundations and algorithmic principles in design of computer systems | | | | | | | | | |
| Outcome has been met for me personally | 5 | 2 | 1 | 0 | 0 | 0 | 36 | 8 | 4.50 |
| How meaningful the outcome is for me personally | 6 | 2 | 0 | 0 | 0 | 0 | 38 | 8 | 4.75 |
| | | | | | | | | | |
| Ability to apply design and development principles to construct complex software systems | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|----|---|------|
| Outcome has been met for me personally | 3 | 5 | 0 | 0 | 0 | 0 | 35 | 8 | 4.38 |
| How meaningful the outcome is for me personally | 5 | 3 | 0 | 0 | 0 | 0 | 37 | 8 | 4.63 |

APPENDIX D-2: Exit (Graduating Student) Survey

SUMMARY OF STATISTICAL RESULTS - SUMMER 2017 TO SPRING 2019

TOTAL RESPONSES → 110

| PROGRAM EDUCATIONAL OUTCOME | TOTAL | FINAL | PERCENTAGE |
|---|-----------|------------------|------------|
| | RESPONSES | SCORE (WEIGHTED) | |
| A - Ability to apply knowledge of computing and mathematics | | | |
| Outcome has been met for me personally | 110 | 4.53 | 90.54 |
| How meaningful the outcome is for me personally | 109 | 4.64 | 92.71 |
| B - Ability to analyze problem - identify and define its computing requirements | | | |
| Outcome has been met for me personally | 110 | 4.56 | 91.23 |
| How meaningful the outcome is for me personally | 110 | 4.87 | 97.31 |
| C - Ability to design, implement, and evaluate a computer-based system | | | |
| Outcome has been met for me personally | 109 | 4.37 | 87.30 |
| How meaningful the outcome is for me personally | 109 | 4.82 | 96.31 |
| D - Ability to function effectively on teams to accomplish a common goal | | | |
| Outcome has been met for me personally | 109 | 4.54 | 90.80 |
| How meaningful the outcome is for me personally | 109 | 4.77 | 95.38 |
| E - Understanding of professional, ethical, legal, security, and social issues | | | |
| Outcome has been met for me personally | 109 | 4.35 | 86.99 |
| How meaningful the outcome is for me personally | 109 | 4.37 | 87.32 |
| F - Ability to communicate effectively with a range of audiences | | | |
| Outcome has been met for me personally | 109 | 4.51 | 90.28 |
| How meaningful the outcome is for me personally | 109 | 4.72 | 94.30 |

| | | | |
|--|-----|------|-------|
| | | | |
| G - Ability to analyze local and global impact of computing on society | | | |
| Outcome has been met for me personally | 84 | 4.31 | 86.15 |
| How meaningful the outcome is for me personally | 84 | 4.35 | 86.91 |
| | | | |
| H - Recognition of the need for and an ability to engage in continuing professional development | | | |
| Outcome has been met for me personally | 84 | 4.43 | 88.61 |
| How meaningful the outcome is for me personally | 84 | 4.75 | 94.98 |
| | | | |
| I - Ability to use current techniques, skills, and tools necessary for computing practice | | | |
| Outcome has been met for me personally | 108 | 4.19 | 83.72 |
| How meaningful the outcome is for me personally | 108 | 4.78 | 95.55 |
| | | | |
| J - Ability to apply mathematical foundations and algorithmic principles in design of computer systems | | | |
| Outcome has been met for me personally | 82 | 4.47 | 89.50 |
| How meaningful the outcome is for me personally | 82 | 4.63 | 92.65 |
| | | | |
| K - Ability to apply design and development principles to construct complex software systems | | | |
| Outcome has been met for me personally | 107 | 4.46 | 89.16 |
| How meaningful the outcome is for me personally | 107 | 4.78 | 95.68 |
| | | | |
| AVERAGE RATING OF STUDENT OUTCOMES - 'A' TO 'K' | | | |
| ATTAINMENT | | 4.34 | 86.75 |
| RELEVANCE | | 4.60 | 92.06 |
| | | | |
| AVERAGE RATING OF STUDENT OUTCOMES - A, B, C, E, G, I, J, K | | | |
| ATTAINMENT | | 4.42 | 88.39 |
| RELEVANCE | | 4.60 | 91.96 |

APPENDIX E-1: Alumni Survey - Raw Data and Statistics

The Alumni Survey data for this cycle was collected between May 2019 and November 2019. It is presented below along with statistical results.

| ALUMNI SURVEY - STATISTICS - 2019 | | | | | | | | | | | |
|--|--|--|-----------------------------------|------|--------------|------|----------------|----------------|-----------|---------|------------|
| | | | | | | | | TOTAL | NUMBER OF | AVERAGE | |
| PROGRAM EDUCATIONAL OBJECTIVE | | | SCORES - # OF STUDENTS RESPONDING | | | | | WEIGHTED SCORE | RESPONSES | SCORE | PERCENTAGE |
| | | | Excellent | Good | Satisfactory | Poor | Unsatisfactory | | | | |
| | | | 4 | 3 | 2 | 1 | 0 | | | | |
| EDUCATIONAL EXPERIENCE | | | | | | | | | | | |
| Capacity for Personal growth | | | 20 | 10 | 6 | 0 | 0 | 122 | 36 | 3.39 | 84.72 |
| Capacity for Lifelong learning | | | 21 | 9 | 5 | 1 | 0 | 122 | 36 | 3.39 | 84.72 |
| Development of Communication Skills | | | 15 | 12 | 7 | 2 | 0 | 112 | 36 | 3.11 | 77.78 |
| Awareness of Social & Ethical Responsibility | | | 14 | 12 | 8 | 2 | 0 | 110 | 36 | 3.06 | 76.39 |
| Preparation for career in CS | | | 19 | 7 | 6 | 3 | 1 | 112 | 36 | 3.11 | 77.78 |
| Preparation for Graduate Study | | | 14 | 12 | 6 | 1 | 3 | 105 | 36 | 2.92 | 72.92 |
| PREPARATION UPON GRADUATION | | | | | | | | | | | |
| Quality of Preparation - Computer programming | | | 22 | 9 | 2 | 2 | 1 | 121 | 36 | 3.36 | 84.03 |
| Quality of Preparation - Systems Development | | | 15 | 5 | 10 | 5 | 1 | 100 | 36 | 2.78 | 69.44 |
| Quality of Preparation - Data Structures & Algo. | | | 21 | 7 | 5 | 2 | 1 | 117 | 36 | 3.25 | 81.25 |
| Quality of Preparation - Comp. Architecture & Org. | | | 13 | 11 | 8 | 2 | 2 | 103 | 36 | 2.86 | 71.53 |
| FACULTY AND INSTRUCTION | | | | | | | | | | | |
| Dedication of Faculty to UG Teaching | | | 15 | 14 | 5 | 2 | 0 | 114 | 36 | 3.17 | 79.17 |
| Expertise of Faculty in Subject Areas | | | 21 | 12 | 2 | 1 | 0 | 125 | 36 | 3.47 | 86.81 |
| Mentorship provided by Faculty | | | 9 | 11 | 8 | 6 | 2 | 91 | 36 | 2.53 | 63.19 |
| Overall Instructional Capability of Faculty | | | 16 | 14 | 4 | 2 | 0 | 116 | 36 | 3.22 | 80.56 |

| | | | | | | | | | |
|---|-----|-----|-----|----|----|------|-----|------|-------|
| DIVERSITY PROMOTION AND ENVIRONMENT | | | | | | | | | |
| Effectiveness in maintaining diverse student body | 20 | 7 | 8 | 1 | 0 | 118 | 36 | 3.28 | 81.94 |
| Diversity as agent for personal growth | 14 | 12 | 9 | 1 | 0 | 111 | 36 | 3.08 | 77.08 |
| Diversity as agent for awareness of social concerns | 13 | 11 | 8 | 4 | 0 | 105 | 36 | 2.92 | 72.92 |
| Extent to which healthy learning env. Is promoted | 17 | 14 | 4 | 1 | 0 | 119 | 36 | 3.31 | 82.64 |
| | | | | | | | | | |
| OVERALL RATING OF EDUCATIONAL EXPERIENCE | 103 | 62 | 38 | 9 | 4 | 683 | 216 | 3.16 | 79.05 |
| OVERALL RATING OF PREPARATION UPON GRADUATION | 71 | 32 | 25 | 11 | 5 | 441 | 144 | 3.06 | 76.56 |
| OVERALL RATING OF FACULTY & INSTRUCTION | 61 | 51 | 19 | 11 | 2 | 446 | 144 | 3.10 | 77.43 |
| OVERALL RATING OF DIVERSITY PROMOTION & ENV. | 64 | 44 | 29 | 7 | 0 | 453 | 144 | 3.15 | 78.65 |
| | | | | | | | | | |
| OVERALL SATISFACTION WITH BS-CS PROG. OBJECTIVES | 299 | 189 | 111 | 38 | 11 | 2023 | 648 | 3.12 | 78.05 |

**APPENDIX E-2: Employer Survey Instrument
FLORIDA INTERNATIONAL UNIVERSITY
SCHOOL OF COMPUTER SCIENCE
(CONFIDENTIAL) EMPLOYER EVALUATION**

To: The Evaluator

The School of Computer Science at Florida International University seeks your confidential opinion about our graduates and your employees, with the goal of using this information to help us assess the effectiveness of our program in preparing our students to enter the work-place. Please rest assured that your opinions will be used only to strengthen our programs and not for any other purpose. We urge you to complete this survey based on the performance of all, or most of our graduates employed by your company. Thank you for your participation.

Part-A:

Your Name:

Your Position:

Company Name:

Office Address:

Office Phone:

E-mail:

Part-B:

Please rate the following skills of our graduates: {Choices: Outstanding, Excellent, Good, Fair, Poor, Unable to Comment}

- 1) Ability to communicate orally
- 2) Ability to communicate in written form
- 3) Ability to work cooperatively in a team
- 4) Understanding of the social and ethical concerns of practicing computer scientist
- 5) Mastery of the fundamental computer science concepts and ability to solve computing problems using them

APPENDIX E-3: Employer Survey Raw Data and Statistics

The Employer Survey data for this cycle was collected between May 2019 and November 2019. It is presented below along with statistical results.

TOTAL RESPONSES → 9 (No more than 5 for any question)

| | | EMPLOYER SURVEY 2017-2019 | | | | | | | | |
|------------|---|---------------------------|-----------|------|------|------|-------|----------|------------|--|
| | | EMPLOYER RESPONSES | | | | | | | | |
| SCIS Prog. | Question about our Graduates | Excellent | Very Good | Good | Fair | Poor | Total | Weighted | Percentage | |
| Objective | | | | | | | | Score | | |
| | Response Score --> | 4 | 3 | 2 | 1 | 0 | | Max. = 4 | | |
| 2.1 | Mastery of CS concepts & ability to solve problems | 2 | 3 | 0 | 0 | 0 | 5 | 3.40 | 85.00 | |
| 2.2 | Ability to Communicate Verbally | 4 | 1 | 0 | 0 | 0 | 5 | 3.80 | 95.00 | |
| 2.2 | Ability to Communicate in Written Form | 4 | 1 | 0 | 0 | 0 | 5 | 3.80 | 95.00 | |
| 2.2 | Ability to work cooperatively in a team | 4 | 1 | 0 | 0 | 0 | 5 | 3.80 | 95.00 | |
| 2.3 | Understanding of Social and Ethical Concerns | 2 | 2 | 0 | 0 | 0 | 4 | 3.50 | 87.50 | |
| 2.4 | Ability to learn Emerging Concepts and Technologies | 3 | 2 | 0 | 0 | 0 | 5 | 3.60 | 90.00 | |
| 1 | Will you consider employing our graduates in future | Yes = 5 | No = 0 | | | | 29 | | | |
| | OVERALL SCORE OF OUR GRADUATES | 3.66 | | | | | | | | |

APPENDIX F: Course-Embedded Assessment Summaries
Summer 2017, Fall 2017, and Spring 2018

| DIRECT ASSESSMENT SUMMARY OF CS COURSES (SENIOR PROJECT EXCLUDED) - SUMMER 2017-SPRING 2018 | | | | | | |
|--|-------------------------------|--------------------------------------|-------------------------------|---------------------------------|--------------|-------------------|
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Spring 2018 | CEN 4010 | Software Engineering | 10 | 10 | 41.67 | 41.67 |
| | | Implementation and Validation | 8 | 3 | 12.50 | 54.17 |
| | | | 7 | 3 | 12.50 | 66.67 |
| | | | 5 | 8 | 33.33 | 100.00 |
| | | | TOTAL --> | 24 | | |
| | 70% cut-off --> (7) | 66.67 | | 75% cut-off --> (7.5) | 54.17 | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Fall 2017 | CGS 3095 | Professional Development | 4 | 45 | 69.23 | 69.23 |
| | | Social & Ethical Concerns | 3 | 13 | 20.00 | 89.23 |
| | | | 2 | 6 | 9.23 | 98.46 |
| | | | 1 | 1 | 1.54 | 100.00 |
| | | | 0 | 0 | 0.00 | 100.00 |
| | | | TOTAL --> | 65 | | |
| | | | 75% cut-off --> (3) | | 89.23 | |

| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
|------------------|-----------------|---|---------------------------|-------------------|---------------|-------------------|
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Fall 2017 | CGS 3095 | Professional Development | 4 | 58 | 98.31 | 98.31 |
| | | Communication Skills | 3 | 1 | 1.69 | 100.00 |
| | | | 2 | 0 | 0.00 | 100.00 |
| | | | 1 | 0 | 0.00 | 100.00 |
| | | | 0 | 0 | 0.00 | 100.00 |
| | | | TOTAL --> | 59 | | |
| | | | 75% cut-off --> | | 100.00 | |
| | | | (3) | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Fall 2017 | CGS 3095 | Professional Development | 4 | 62 | 96.88 | 96.88 |
| | | Legal, ethical, and social impacts | 3 | 2 | 3.13 | 100.00 |
| | | of technology as related to | 2 | 0 | 0.00 | 100.00 |
| | | individual privacy, security, and | 1 | 0 | 0.00 | 100.00 |
| | | anonymity in societies across | 0 | 0 | 0.00 | 100.00 |
| | | the globe and in the global | | | | |
| | | internet society | TOTAL --> | 64 | | |
| | | | 75% cut-off --> | | 100.00 | |
| | | | (3) | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |

| | | | | | | |
|-----------------|---------------|---|--------------|---------------------|----------|-------------------|
| Fall 2017 | CGS 3095 | Professional Development | 4 | 45 | 69.23 | 69.23 |
| | | Legal, ethical, and social impacts | 3 | 13 | 20.00 | 89.23 |
| | | of technology as related to | 2 | 6 | 9.23 | 98.46 |
| | | intellectual property rights, and | 1 | 1 | 1.54 | 100.00 |
| | | how the global reach of the internet effects these issues | 0 | 0 | 0.00 | 100.00 |
| | | | TOTAL --> | 65 | | |
| | | | | | | |
| | | | | 75% cut-off --> (3) | 89.23 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | CGS 3095 | Professional Development | 4 | 66 | 100.00 | 100.00 |
| | | Computing Professional's Roles | 3 | 0 | 0.00 | 100.00 |
| | | and Responsibilities as related to | 2 | 0 | 0.00 | 100.00 |
| | | intellectual property, privacy, | 1 | 0 | 0.00 | 100.00 |
| | | anonymity, legal, social, and | 0 | 0 | 0.00 | 100.00 |
| | | ethical issues | | | | |
| | | | TOTAL --> | 66 | | |
| | | | | | | |
| | | | | 75% cut-off --> (3) | 100.00 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | COP 3337 | Programming | 8 | 27 | 62.79 | 62.79 |
| | | Inheritance & Polymorphism | 7 | 10 | 23.26 | 86.05 |

| | | | | | | | |
|------------------|-----------------|--|--|--------------------------|-------------------|-----------------|-------------------|
| | | | | 6 | 2 | 4.65 | 90.70 |
| | | | | 0 | 4 | 9.30 | 100.00 |
| | | | | | | | |
| | | | | TOTAL | 43 | | |
| | | | | L--> | | | |
| | | | | | | | |
| | | | | 75% cut-off -> | | 90.70 | |
| | | | | (6) | | | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Fall 2017 | COP 3337 | Programming | | 8 | 26 | 60.47 | 60.47 |
| | | Exceptions | | 7 | 7 | 16.28 | 76.74 |
| | | | | 6 | 5 | 11.63 | 88.37 |
| | | | | 5 | 2 | 4.65 | 93.02 |
| | | | | 1 | 1 | 2.33 | 95.35 |
| | | | | 0 | 2 | 4.65 | 100.00 |
| | | | | | | | |
| | | | | TOTAL | 43 | | |
| | | | | L--> | | | |
| | | | | | | | |
| | | | | 75% cut-off -> | | 88.37 | |
| | | | | (6) | | | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Fall 2017 | COP 3530 | Programming | | 16 | 6 | 18.18182 | 18.18 |
| | | Data Structures & Analysis of Algo. | | 15 | 3 | 9.090909 | 27.27 |
| | | | | 14 | 10 | 30.30303 | 57.58 |
| | | | | 13 | 4 | 12.12121 | 69.70 |
| | | | | 11 | 3 | 9.090909 | 78.79 |

| | | | | | | |
|------------------|-----------------|--------------------------|------------------------|-------------------|--------------|-------------------|
| | | | 10.5 | 4 | 12.121 21 | 90.91 |
| | | | 8 | 2 | 6.0606 06 | 96.97 |
| | | | 1.5 | 1 | 3.0303 03 | 100.00 |
| | | | | | | |
| | | | Total - -> | 33 | | |
| | | | | | | |
| | | | 75% cut-off -> (12) | | 69.70 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | COP 3530 | Programming | 8 | 14 | 38.89 | 38.89 |
| | | Abstraction | 7 | 13 | 36.11 | 75.00 |
| | | | 6 | 6 | 16.67 | 91.67 |
| | | | 5 | 3 | 8.33 | 100.00 |
| | | | | | | |
| | | | Total - -> | 36 | | |
| | | | | | | |
| | | | 75% cut-off -> (6) | | 91.67 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | COP 3530 | Programming | 12 | 23 | 63.89 | 63.89 |
| | | Use of Java API | 11 | 6 | 16.67 | 80.56 |
| | | | 9 | 2 | 5.56 | 86.11 |
| | | | 6 | 4 | 11.11 | 97.22 |
| | | | 5 | 1 | 2.78 | 100.00 |
| | | | | | | |
| | | | Total - -> | 36 | | |

| | | | | | | | |
|------------------|-----------------|--------------------------|--|-----------------------|-------------------|--------------|-------------------|
| | | | | | | | |
| | | | | 75% cut-off -> (9) | | 86.11 | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Fall 2017 | COP 3530 | Programming | | 8 | 11 | 30.56 | 30.56 |
| | | Linked Structures | | 7 | 6 | 16.67 | 47.22 |
| | | | | 6 | 7 | 19.44 | 66.67 |
| | | | | 5 | 7 | 19.44 | 86.11 |
| | | | | 4 | 4 | 11.11 | 97.22 |
| | | | | 3 | 1 | 2.78 | 100.00 |
| | | | | | | | |
| | | | | Total -> | 36 | | |
| | | | | | | | |
| | | | | 75% cut-off -> (6) | | 66.67 | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Fall 2017 | COP 3530 | Programming | | 8 | 30 | 83.33 | 83.33 |
| | | Recursion | | 7 | 1 | 2.78 | 86.11 |
| | | | | 5 | 3 | 8.33 | 94.44 |
| | | | | 4 | 1 | 2.78 | 97.22 |
| | | | | 1 | 1 | 2.78 | 100.00 |
| | | | | | | | |
| | | | | Total -> | 36 | | |
| | | | | | | | |
| | | | | 75% cut-off -> (6) | | 86.11 | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |

| | NUMBER | TOPIC DESCRIPTION | | | | |
|-----------|---------------------|------------------------------|-----------------------|------------|-------|------------|
| Fall 2015 | COP 4338 | Computer Systems | 8 | 9 | 64.29 | 64.29 |
| | | Computer Systems - Processes | 7 | 2 | 14.29 | 78.57 |
| | | | 5 | 1 | 7.14 | 85.71 |
| | | | 4 | 1 | 7.14 | 92.86 |
| | | | 3 | 1 | 7.14 | 100.00 |
| | | | Total -> | 14 | | |
| | | | 75% cut-off --> (6) | | 78.57 | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Fall 2017 | COP 4338 | Computer Systems | 10 | 7 | 35.00 | 35.00 |
| | | C Language Proficiency | 9 | 2 | 10.00 | 45.00 |
| | | | 8 | 4 | 20.00 | 65.00 |
| | | | 7 | 2 | 10.00 | 75.00 |
| | | | 6 | 1 | 5.00 | 80.00 |
| | | | 5 | 1 | 5.00 | 85.00 |
| | | | 4 | 1 | 5.00 | 90.00 |
| | | | 3 | 2 | 10.00 | 100.00 |
| | | | Total -> | 20 | | |
| | 70% cut-off --> (7) | 75.00 | 75% cut-off --> (7.5) | | 65.00 | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Fall 2017 | COP 4555 | Foundations | 10 | 9 | 28.13 | 28.13 |

| | | | | | | |
|------------------|-------------------------------|--|---------------------------------|-------------------|--------------|-------------------|
| | | Survey of Programming Languages | 9 | 4 | 12.50 | 40.63 |
| | | | 8 | 2 | 6.25 | 46.88 |
| | | | 7 | 8 | 25.00 | 71.88 |
| | | | 6 | 3 | 9.38 | 81.25 |
| | | | 5 | 1 | 3.13 | 84.38 |
| | | | 4 | 5 | 15.63 | 100.00 |
| | | | | | | |
| | | | Total -> | 32 | | |
| | | | | | | |
| | 70% cut-off --> (7) | 71.88 | 75% cut-off --> (7.5) | | 46.88 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | COP 4610 | Computer Systems | 12 | 17 | 43.59 | 43.59 |
| | | Memory Management | 11.4 | 13 | 33.33 | 76.92 |
| | | | 11.28 | 3 | 7.69 | 84.62 |
| | | | 10.4 | 1 | 2.56 | 87.18 |
| | | | 3.6 | 2 | 5.13 | 92.31 |
| | | | 2.1 | 1 | 2.56 | 94.87 |
| | | | 0 | 2 | 5.13 | 100.00 |
| | | | | | | |
| | | | Total -> | 39 | | |
| | | | | | | |
| | | | 75% cut-off --> (9) | | 87.18 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | COP 4610 | Computer Systems | 12 | 5 | 14.29 | 14.29 |
| | | Storage Management | 11.8 | 2 | 5.71 | 20.00 |
| | | | 11.1 | 2 | 5.71 | 25.71 |
| | | | 11 | 2 | 5.71 | 31.43 |

| | | | | | | | |
|--------------------|-----------------|----------------------------|--|------------------------------------|-------------------|--------------|-------------------|
| | | | | 10.8 | 3 | 8.57 | 40.00 |
| | | | | 10.6 | 1 | 2.86 | 42.86 |
| | | | | 10.4 | 2 | 5.71 | 48.57 |
| | | | | 9.8 | 2 | 5.71 | 54.29 |
| | | | | 9.7 | 1 | 2.86 | 57.14 |
| | | | | 9 | 1 | 2.86 | 60.00 |
| | | | | 8.5 | 2 | 5.71 | 65.71 |
| | | | | 8.3 | 1 | 2.86 | 68.57 |
| | | | | 7.4 | 2 | 5.71 | 74.29 |
| | | | | 6 | 8 | 22.86 | 97.14 |
| | | | | 3.6 | 1 | 2.86 | 100.00 |
| | | | | | | | |
| | | | | Total - -> | 35 | | |
| | | | | | | | |
| | | | | 75% cut-off --> (9) | | 60.00 | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Spring 2018 | COP 4710 | Computer Systems | | 16 | 0 | 0.00 | 0.00 |
| | | Database Management | | 13 | 7 | 12.96 | 12.96 |
| | | | | 12 | 4 | 7.41 | 20.37 |
| | | | | 11 | 8 | 14.81 | 35.19 |
| | | | | 10 | 12 | 22.22 | 57.41 |
| | | | | 9 | 13 | 24.07 | 81.48 |
| | | | | 8 | 7 | 12.96 | 94.44 |
| | | | | 7 | 2 | 3.70 | 98.15 |
| | | | | 6 | 1 | 1.85 | 100.00 |
| | | | | | | | |
| | | | | Total - -> | 54 | | |
| | | | | | | | |
| | | | | 75% cut-off --> (12) | | 20.37 | |
| | | | | | | | |

| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
|--------------------|-----------------|--------------------------------------|---------------------------|-------------------|--------------|-------------------|
| | NUMBER | TOPIC DESCRIPTION | | | | |
| Spring 2018 | COT 3100 | Foundations | 24 | 5 | 17.24 | 17.24 |
| | | Discrete Structures | 23 | 1 | 3.45 | 20.69 |
| | | | 22 | 2 | 6.90 | 27.59 |
| | | | 21 | 3 | 10.34 | 37.93 |
| | | | 20 | 4 | 13.79 | 51.72 |
| | | | 19 | 4 | 13.79 | 65.52 |
| | | | 18 | 3 | 10.34 | 75.86 |
| | | | 17 | 1 | 3.45 | 79.31 |
| | | | 16 | 2 | 6.90 | 86.21 |
| | | | 15 | 1 | 3.45 | 89.66 |
| | | | 14 | 1 | 3.45 | 93.10 |
| | | | 12 | 1 | 3.45 | 96.55 |
| | | | 10 | 1 | 3.45 | 100.00 |
| | | | | | | |
| | | | Total -> | 29 | | |
| | | | | | | |
| | | | 75% cut-off --> | | 75.86 | |
| | | | (18) | | | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Fall 2017 | MAD 2104 | Foundations | 16 | 4 | 11.11 | 11.11 |
| | | Discrete Structures and Logic | 15 | 4 | 11.11 | 22.22 |
| | | | 14 | 4 | 11.11 | 33.33 |
| | | | 13 | 5 | 13.89 | 47.22 |
| | | | 12 | 3 | 8.33 | 55.56 |
| | | | 11 | 3 | 8.33 | 63.89 |
| | | | 10 | 1 | 2.78 | 66.67 |
| | | | 9 | 5 | 13.89 | 80.56 |
| | | | 8 | 1 | 2.78 | 83.33 |
| | | | 7 | 3 | 8.33 | 91.67 |

| | | | | 5 | 2 | 5.56 | 97.22 |
|-------------|---------------------|----------------------|-------|-------------------------|-------|------------|--------|
| | | | | 3 | 1 | 2.78 | 100.00 |
| | | | | | | | |
| | | | | TOTAL L--> | 36 | | |
| | | | | | | | |
| | | | | 75% cut-off --> (12) | | 55.56 | |
| | | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative | |
| | NUMBER | TOPIC DESCRIPTION | | | | | |
| | | | | | | | |
| Spring 2018 | MAD 3512 | Foundations | 10 | 0 | 0.00 | 0.00 | |
| | | Theory of Algorithms | 9 | 2 | 6.06 | 6.06 | |
| | | | 8 | 5 | 15.15 | 21.21 | |
| | | | 7 | 5 | 15.15 | 36.36 | |
| | | | 6 | 10 | 30.30 | 66.67 | |
| | | | 5 | 3 | 9.09 | 75.76 | |
| | | | 4 | 4 | 12.12 | 87.88 | |
| | | | 3 | 3 | 9.09 | 96.97 | |
| | | | 2 | 1 | 3.03 | 100.00 | |
| | | | | | | | |
| | | | | TOTAL L--> | 33 | | |
| | | | | | | | |
| | 70% cut-off --> (7) | 36.36 | | 75% cut-off --> (7.5) | | 21.21 | |

For the CGS 3095, separate Direct Evaluation was performed by an instructor. The results are given below.

| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
|-------------|----------|--------------------------|-------|------------|-------|------------|
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Summer 2017 | CGS 3095 | Professional Development | 4 | 41 | 44.57 | 44.57 |

| | | | | | | |
|--------------------|-----------------|---|---------------------------|-------------------|--------------|-------------------|
| | RVC | Social & Ethical Concerns | 3 | 23 | 25.00 | 69.57 |
| | | | 2 | 14 | 15.22 | 84.78 |
| | | | 1 | 14 | 15.22 | 100.00 |
| | | | 0 | 0 | 0.00 | 100.00 |
| | | | | | | |
| | | | TOTAL | 92 | | |
| | | | L --> | | | |
| | | | 75% cut-off --> | | 69.57 | |
| | | | (3) | | | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Summer 2017 | CGS 3095 | Professional Development | 4 | 56 | 60.87 | 60.87 |
| | RVC | Communication Skills | 3 | 15 | 16.30 | 77.17 |
| | | | 2 | 15 | 16.30 | 93.48 |
| | | | 1 | 6 | 6.52 | 100.00 |
| | | | 0 | 0 | 0.00 | 100.00 |
| | | | | | | |
| | | | TOTAL | 92 | | |
| | | | L --> | | | |
| | | | 75% cut-off --> | | 77.17 | |
| | | | (3) | | | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Summer 2017 | CGS 3095 | Professional Development | 4 | 38 | 41.30 | 41.30 |
| | RVC | Legal, ethical, and social impacts | 3 | 13 | 14.13 | 55.43 |
| | | of technology as related to | 2 | 14 | 15.22 | 70.65 |
| | | individual privacy, security, and | 1 | 27 | 29.35 | 100.00 |

| | | | | | | |
|-----------------|---------------|--|---------------------|-------------------|----------|-------------------|
| | | anonymity in societies across the globe and in the global internet society | 0 | 0 | 0.00 | 100.00 |
| | | | TOTAL --> | 92 | | |
| | | | | | | |
| | | | 75% cut-off --> (3) | | 55.43 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Summer 2017 | CGS 3095 | Professional Development | 4 | 33 | 35.87 | 35.87 |
| | RVC | Legal, ethical, and social impacts | 3 | 22 | 23.91 | 59.78 |
| | | of technology as related to | 2 | 11 | 11.96 | 71.74 |
| | | intellectual property rights, and | 1 | 26 | 28.26 | 100.00 |
| | | how the global reach of the internet effects these issues | 0 | 0 | 0.00 | 100.00 |
| | | | TOTAL --> | 92 | | |
| | | | | | | |
| | | | 75% cut-off --> (3) | | 59.78 | |
| | | | | | | |
| SEMESTER | COURSE | PROGRAM OBJECTIVE | Score | # Students | % | Cumulative |
| | NUMBER | TOPIC DESCRIPTION | | | | |
| | | | | | | |
| Summer 2017 | CGS 3095 | Professional Development | 4 | 58 | 63.04 | 63.04 |
| | RVC | Computing Professional's Roles | 3 | 10 | 10.87 | 73.91 |
| | | and Responsibilities as related to | 2 | 8 | 8.70 | 82.61 |

| | | | | | | |
|--|--|--|-----------------------------------|-----------|--------------|---------------|
| | | intellectual property, privacy, | 1 | 16 | 17.39 | 100.00 |
| | | anonymity, legal, social, and | 0 | 0 | 0.00 | 100.00 |
| | | ethical issues | | | | |
| | | | TOTA L --> | 92 | | |
| | | | | | | |
| | | | 75% cut-off --> (3) | | 73.91 | |

APPENDIX G-1: Senior Project Assessment Instruments

Rating-Sheet

Senior Project

Assessment of Student Outcomes of the BS in Computer Science
of the
FIU School of Computing and Information Sciences

Project Title: «Title1»

Number of team members: «Team Members» Semester & Year: «Semester»

Project origination: «Origination»

Evaluator

Affiliation

«Evaluator» «Evaluator Affiliation»

=====
Your responses to this survey instrument will be used solely for the purpose of assessing the Student Outcomes of the BS in Computer Science program of the School of Computing and Information Sciences at FIU. The survey is expressly NOT for assessment of student performance in the SCIS Senior Project course, nor for assessment of the instructor(s).

For each Student Outcome, decide whether this project provides sufficient evidence to make a judgment about the students' attainment of that Student Outcome. If so, please indicate your assessment of the level of attainment of that Student Outcome demonstrated in this project:

| <u>Rating</u> | <u>Criterion</u> |
|---------------|---|
| n/a | The project does not provide clear evidence about this particular outcome |
| 1 | The project demonstrates poor attainment of this outcome |
| 2 | The project demonstrates fair attainment of this outcome |
| 3 | The project demonstrates good attainment of this outcome |
| 4 | The project demonstrates very good attainment of this outcome |
| 5 | The project demonstrates excellent attainment of this outcome |

BS in CS Student Outcomes Assessment via Senior Project

| Student Outcomes | Rating |
|---|---------------|
| a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline. | «a» |
| b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. | «b» |
| c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs. | «c» |
| d) An ability to function effectively on teams to accomplish a common goal. | «d» |
| e) An understanding of professional, ethical, legal, security and social issues and responsibilities. | «e» |
| f) An ability to communicate effectively with a range of audiences. | «f» |
| g) An ability to analyze the local and global impact of computing on individuals, organizations, and society. | «g» |
| h) Recognition of the need for and an ability to engage in continuing professional development. | «h» |
| i) An ability to use current techniques, skills, and tools necessary for computing practice. | «i» |
| j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. | «j» |
| k) An ability to apply design and development principles in the construction of software systems of varying complexity. | «k» |

Rubric («Semester»)

Senior Project

**Assessment of Student Outcomes of the BS in Computer Science
of the
School of Computing and Information Sciences
Florida International University**

The School of Computing and Information Sciences evaluates the Senior Projects of its graduating seniors for the purpose of assessing the level of attainment of the Student Outcomes of the BS in Computer Science program.

Your responses to this survey will be used solely for the purpose of assessing the Student Outcomes of the BS in Computer Science program of the School of Computing and Information Sciences at FIU. This survey is expressly NOT for assessment of student performance in the SCIS Senior Project course for assignment of letter grade, nor for assessment of the instructor(s).

Rating Instructions

For each program outcome standard, you are provided with a check-list of 7 or more criteria that evidence attainment of that standard. Please check all criteria that are represented in this project. You may include additional criteria that are not explicitly listed; if so, please record the additional criteria in the appropriate sections. Unless noted otherwise, the number of checked criteria in each section, up to a maximum of 5, will be recorded as your rating of attainment of that outcome standard evidenced in the project.

Project Title: «**Title1**»

Semester & Year: «**Semester**»

Moderator (Faculty / Industry Sponsor): «**Moderator**»

Evaluators: «**Evaluator**»

Student Outcome (a): *An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.*



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«a1» Students used math expressions in their project.

«a2» Students used logical expressions in their project.

«a3» Students used statistics to characterize and interpret data in their project.

«a4» Students used models to solve problems in their project.

«a5» Students performed data analysis in their project.

«a6» Students developed mathematical algorithms in their project.

«a7» Students analyzed complexity and efficiency in their project.

«a8» Students developed model for some processes in their project.

«a9» Students used formal verification and formal proofs in their project.

Student Outcome (b): *An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.*



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«b1» Students casted a real-world problem to a computing problem in their project.

«b2» Students modified problem definition as new information arrived in their project.

«b3» Students elicited requirement from users in their project.

«b4» Students developed requirements specifications in their project.

«b5» Students conducted feasibility studies in their project.

«b6» Students formulated solution strategies in their project.

«b7» Students estimated resources required for their proposed solution.

«b8» Students evaluated the space, time, and financial demands of their solution.

«b9» Students mapped identified appropriate languages, platforms, and hardware in their project.

Student Outcome (c): *An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.*



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«c1» Students applied software engineering principles to produce their solution to the problem in their project.

«c2» Students considered alternatives technologies and development methodologies in their project.

«c3» Students developed design documents in their project.

«c4» Students used two or more high level languages in their project.

«c5» Students developed metrics for testing and verifying their solution in their project.

«c6» Students created a set of tests and use them to verify their solution.

«c7» Students measured system performance and quality of service in their project.

Student Outcome (d): *An ability to function effectively on teams to accomplish a common goal.*



Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

To be completed by an evaluator

«d1» All team members contributed equally to the project.

«d2» All team members activities were appropriately and adequately documented.

To be completed from the data obtained from team members' peer evaluations

Each team member rates each of the other members of their team individually on each criterion listed below on a scale of 1 to 5. The mean of all ratings for each criterion is recorded.

The rubric item is checked only if the project (mean) score ≥ 4.0 for each of the 2 criteria.

«d3» Team members' roles were clearly defined and executed

| <u>Criterion</u> | <u>Mean Score</u> |
|--|-------------------|
| 1: <i>Team members had clear understanding of expectations.</i> | «d31» |
| 2: <i>Team members maximized the use of their individual skill sets.</i> | «d32» |

«d4» Project team set out and followed a schedule for timely completion

| <u>Criterion</u> | <u>Mean Score</u> |
|--|-------------------|
| 3: <i>Team members complied with mechanisms to track progress.</i> | «d41» |
| 4: <i>Team members completed assignments in a timely fashion.</i> | «d42» |

«d5» Project team negotiated consensus when needed

| <u>Criterion</u> | <u>Mean Score</u> |
|--|-------------------|
| 5: <i>Team members showed respect for other team members opinions.</i> | «d51» |
| 6: <i>Team members were able to negotiate and compromise.</i> | «d52» |

«d6» Project completion evidences equitable participation by team members

| <u>Criterion</u> | <u>Mean Score</u> |
|--|-------------------|
| 7: <i>Team members contributed ideas and viewpoints.</i> | «d61» |
| 8: <i>Team members did their fair share of the work.</i> | «d62» |

«d7» Team members shared responsibility for success and failure

| <u>Criterion</u> | <u>Mean Score</u> |
|--|-------------------|
| 9: <i>Team members actively sought & shared information from each other.</i> | «d71» |
| 10: <i>Team members were adaptable to changing requirements.</i> | «d72» |

Student Outcome (e): An understanding of professional, ethical, legal, security and social issues and responsibilities.



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«e1» Students demonstrated understanding of intellectual property issues in their project.

«e2» Students demonstrated working knowledge of a code of ethics in their project.

«e3» Students recognized situations where discrimination arose in their project.

«e4» Students demonstrated proper etiquette and proactive social behavior in professional situations in their project.

«e5» Students suggested remedies for specific situations which create a hostile work environment in their project.

«e6» Students properly cited documents sources and references in their project.

«e7» Students identified and addressed some relevant legal issues in their project.

«e8» Students identified and addressed some relevant privacy issues in their project.

«e9» Students identified and addressed some relevant security issues in their project.

Program Outcome (f): *An ability to communicate effectively with a range of audiences.*



Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Written presentation

«f1» Completeness Students documented all essential project features.

«f2» Organization Students provided a well-organized final document.

Oral Presentation

- 1) Rate each presenter individually using the oral presentation rubric provided
- 2) Record the presenters' ratings of each presenter in each rubric item
- 3) Calculate the mean presenter rating for each rubric item
- 4) **For each rubric item, check only if the mean score ≥ 3.0**

«f3» Domain Knowledge:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|-------|
| «f31» | «f32» | «f33» | «f34» | «f35» | «f36» |

«f4» Organization:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|-------|
| «f41» | «f42» | «f43» | «f44» | «f45» | «f46» |

«f5» Presentation Aids:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|-------|
| «f51» | «f52» | «f53» | «f54» | «f55» | «f56» |

«f6» Elocution:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|-------|
| «f61» | «f62» | «f63» | «f64» | «f65» | «f66» |

«f7» Audience Contact:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|-------|
| «f71» | «f72» | «f73» | «f74» | «f75» | «f76» |

Student Outcome (g): *An ability to analyze the local and global impact of computing on individuals, organizations, and society.*

«g»

Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«g1» Students demonstrated understanding of various ways in which computing technology impacts individuals in their project.

«g2» Students demonstrated understanding of various ways in which computing technology impacts organizations in their project.

«g3» Students demonstrated understanding of various ways in which computing technology impacts societies in their project.

«g4» Students identified key concepts, definitions, and facts associated with positive impacts of computer technology in their project.

«g5» Students identified key concepts, definitions, and facts associated with negative impacts of computer technology in their project.

«g6» Students demonstrated appropriate and comprehensive critical thinking skills and habits of mind to analyze, evaluate and synthesize evidence in their project.

«g7» Students recognized and suggested appropriate remedies for activities involving computing technology which affect adversely users of computing technologies in their project.

Student Outcome (h): *Recognition of the need for and an ability to engage in continuing professional development.*



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«h1» Students identified the competencies and knowledge required by particular application domains in their project.

«h2» Students demonstrated knowledge of the history of computing and the rapidly evolving nature of the computing discipline in their project.

«h3» Students showed an understanding of what skill sets are currently desired by employers in their project.

«h4» Students showed knowledge of computer-related professional organizations (ACM, IEEE), publications, and conferences.

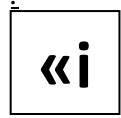
«h5» Students showed knowledge of various avenues for professional development past the undergraduate college experience.

«h6» Students demonstrated learning of a new development tool without instructor guidance in their project.

«h7» Students demonstrated the ability to research topics using the web, library, and professional publications in their project.

«h8» Students demonstrated ability to reflect on their learning process and their own understanding in their project.

Program Outcome (i): An ability to use current techniques, skills, and tools necessary for computing practice.



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Self-ratings of competency are provided by the student project-team on the following scale:

5: Expert, 4: Advanced, 3: Competent, 2: Intermediate, 1: Novice

Check-mark is earned if the team's competency rating is 2 or higher.

«i1» Students used contemporary presentation and demonstration tools in their project.

«i2» Students developed artifacts using modern document preparation tools in their project.

«i3» Students employed management and/or version control software in their project.

«i4» Students utilized modeling software in their project.

«i5» Students utilized contemporary database management systems in their project.

«i6» Students performed web-based programming (server, web-page, etc.) in their project.

«i7» Students performed testing using contemporary validation/testing software in their project.

Student Outcome (j): *An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.*

Mathematical Foundations



Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«j1» Students used math expressions in their project.

«j2» Students used logical expressions in their project.

«j3» Students used statistics in their project.

«j4» Students performed formal proofs.

«j5» Students implemented mathematical algorithms.

«j6» Students developed models in their project.

«j7» Students demonstrated the use of design trade off in their project.

Student Outcome (k): *An ability to apply design and development principles in the construction of software systems of varying complexity.*



Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

«k1» Students contributed in the design and development of a small-, medium-, or large-scale software system in their project.

«k2» Students demonstrated understanding of the Software Development Life Cycle in their project.

«k3» Students developed Project Specification in their project.

«k4» Students performed Feasibility Study and/or develop Project Plan in their project.

«k5» Students developed Requirements Documentation in their project.

«k6» Students developed Design Documentation in their project.

«k7» Students performed and documented testing and/or evaluation of the implementation in their project.

«k8» Students performed system walkthroughs in their project.

Notes: «Notes»

APPENDIX G-2: Senior Project Assessment Results – Summer 2017

| | | | | | | | | | | | |
|--|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------|-----------------------------|-----------------------------|-------------------------|-------------------------|-----------------------------|
| CIS 4911 - Senior Project | | | Summer 2017 | | | | | | | | |
| | | | | | | | | | | | |
| | <u>Outco me (a)</u> | <u>Outco me (b)</u> | <u>Outco me (c)</u> | <u>Outco me (d)</u> | <u>Outco me (e)</u> | <u>Outco me (f)</u> | <u>Outco me (g)</u> | <u>Outco me (h)</u> | <u>Outco me (i)</u> | <u>Outco me (j)</u> | <u>Outco me (k)</u> |
| Project 1 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| ASI- Panther- Centric- V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 2 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Agricult ural- Robotics -V3 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 3 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Automat ed-Doc- Sum-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 4 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| BOLO - V8 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 5 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Breaze- Home- V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 4 | 5 |
| | | | | | | | | | | | |
| Project 6 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Expl- Unconsc ious-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 7 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| FLACAD A - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|
| Project 8 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Learn-w/-Aug-Real-V3 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 9 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Life-Mgmt-Plat-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 10 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Mobile-Judge-V9 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 11 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| PPMS - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 12 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Skill-Court-V8 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 13 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Smart-Billionaires-V1 | 5 | 5 | 4 | 2 | 3 | 5 | | 5 | 5 | 4 | 5 |
| | | | | | | | | | | | |
| Project 14 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Strm-Comm-Svc-Pro-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 15 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Traffic-Simulator-V2 | 3 | 5 | 4 | 4 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Project 16 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VIP-Website-V6 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 17 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Virtual-Roll-Call-V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 18 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| WEB-VAR-for-Web-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| | <u>Outcome (a)</u> | <u>Outcome (b)</u> | <u>Outcome (c)</u> | <u>Outcome (d)</u> | <u>Outcome (e)</u> | <u>Outcome (f)</u> | <u>Outcome (g)</u> | <u>Outcome (h)</u> | <u>Outcome (i)</u> | <u>Outcome (j)</u> | <u>Outcome (k)</u> |
| Mean | 3.06 | 5.00 | 4.00 | 4.78 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.06 | 5.00 |

APPENDIX G-3: Senior Project Assessment Results – Fall 2017

| | | | | | | | | | | | | |
|--|-----------------------------|-----------------------------|--------------------------------------|-----------------------------|-------------------------|-----------------------------|-----------------------------|-------------------------|-------------------------|-----------------------------|---|--|
| CIS 4911 - Senior Project | | | Fall 2017 | | | | | | | | | |
| | <u>Outco me (a)</u> | <u>Outco me (b)</u> | <u>Outco me (c) (d)</u> | <u>Outco me (e)</u> | <u>Outco me (f)</u> | <u>Outco me (g)</u> | <u>Outco me (h)</u> | <u>Outco me (i)</u> | <u>Outco me (j)</u> | <u>Outco me (k)</u> | | |
| Project 1 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| AR VR VE for CS Educatio n -V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| Project 2 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Betwixt- V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| Project 3 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| BOLO - V9 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| Project 4 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze- Home- V3 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| Project 5 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Cancer Care App - V1 | 3 | 5 | 4 | 4 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| Project 6 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Learn- w/-Aug- Real-V4 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |

| | | | | | | | | | | | |
|--------------------------------------|---|---|---|---|---|---|--|---|---|---|---|
| | | | | | | | | | | | |
| Project 7 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Life Mgmt Mobile App - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 8 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Microdata and Algorithms - V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 9 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Mobile-Judge-V10 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 10 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Skill-Court-V9 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 11 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Smart City - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 12 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Spotify Learn. Mgmt System-V1 | 3 | 5 | 4 | 2 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 13 | 3 | 4 | 3 | | 3 | 5 | | 4 | | 3 | 5 |
| THINKivators - V1 | 3 | 4 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Project 14 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VIP-Website -V7 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 15 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VIR - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 16 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Virtual-Roll-Call-V3 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| | <u>Outcome (a)</u> | <u>Outcome (b)</u> | <u>Outcome (c)</u> | <u>Outcome (d)</u> | <u>Outcome (e)</u> | <u>Outcome (f)</u> | <u>Outcome (g)</u> | <u>Outcome (h)</u> | <u>Outcome (i)</u> | <u>Outcome (j)</u> | <u>Outcome (k)</u> |
| Mean | 3.06 | 4.94 | 3.97 | 4.75 | 3.00 | 5.00 | | 4.97 | 5.00 | 3.00 | 5.00 |

APPENDIX G-4: Senior Project Assessment Results – Spring 2018

| | | | | | | | | | | | | |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
| CIS 4911 - Senior Project | | | Spring 2018 | | | | | | | | | |
| | | | | | | | | | | | | |
| | <u>Outc ome</u> (a) | <u>Outc ome</u> (b) | <u>Outc ome</u> (c) | <u>Outc ome</u> (d) | <u>Outc ome</u> (e) | <u>Outc ome</u> (f) | <u>Outc ome</u> (g) | <u>Outc ome</u> (h) | <u>Outc ome</u> (i) | <u>Outc ome</u> (j) | <u>Outc ome</u> (k) | |
| Project 1 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| AR VR VE for CS Education - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 2 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| BOLO - V10 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 3 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze- Home-V4 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 4 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Citizen Scientist proj App - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 5 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Code VR - V1 | 3 | 5 | 4 | | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 6 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Dr Horticulur e - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 7 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Learning w/ Virtual AR - V5 | 3 | 5 | 4 | | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 8 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |

| | | | | | | | | | | | |
|--|---|---|---|---|---|---|--|---|---|---|---|
| Mach Learn for Code Mgmt-V1 | 4 | 5 | 4 | 2 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 9 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Nihon GO - V1 | 3 | 5 | 4 | 2 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 10 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| SEED Sec Eval of Encr DBs - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 11 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Skill Court - V10 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 12 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Smart Stormwater - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 13 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Snackability - V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 14 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| To Do List Optimizer - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 15 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VIP Web. V8 & Mob Judge-V10.1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 16 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VIR Vocabulary in Reading - V3 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 17 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |

| | | | | | | | | | | | |
|--|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| VRC Virtual Roll Call - V4 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 18 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| VR Gaming to Brd Part. In CS-V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 19 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Web Page Arch. & Cont Anal-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| | <u>Outcome</u> (a) | <u>Outcome</u> (b) | <u>Outcome</u> (c) | <u>Outcome</u> (d) | <u>Outcome</u> (e) | <u>Outcome</u> (f) | <u>Outcome</u> (g) | <u>Outcome</u> (h) | <u>Outcome</u> (i) | <u>Outcome</u> (j) | <u>Outcome</u> (k) |
| Mean | 3.08 | 5.00 | 4.00 | 4.65 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 |

APPENDIX G-5: Senior Project Assessment Results – Summer 2018

| CIS 4911 - Senior Project | | | Summer 2018 | | | | | | | | | |
|---------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|
| | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | |
| Project 1 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home Agent - V5 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 2 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home Chat System - V5 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 3 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home List Property - V5 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 4 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home Local Scoop - V5 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 5 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home Mortgage Calc-V5 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 6 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 | |
| Breaze Home Results Page - V5 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | <u>Outc ome</u> | |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | |
| Mean | 3.08 | 5.00 | 4.00 | 5.00 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 | |

APPENDIX G-6: Senior Project Assessment Results – Fall 2018

| | | | | | | | | | | | |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| CIS 4911 - Senior Project | | | Fall 2018 | | | | | | | | |
| | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) |
| Project 1 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Aeromedical Eval App - V1 | 3 | 5 | 4 | 3 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 2 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Agenda Mgmt System - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 3 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| BOLO - V11 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 4 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Citizen Scientist App - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 5 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Environment Scholar - V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 6 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Exploring the Unconscious - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 7 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Mobile Judge - V11 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 8 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Interactive Table - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 9 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Learn w/ Virtual AR - V6 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |

| | | | | | | | | | | | |
|----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Project 10 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| LMS in Facebook - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 11 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Min. Inspir. Min. in Comp.-V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 12 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Multi Vehicle Patrolling - V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 13 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Simulation Platform - V1 | 4 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 14 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Snackability - V2 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 15 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Vertically Integrated Proj. - V9 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 16 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Virtual Roll Call - V5 | 3 | 5 | 4 | 2 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 17 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| Vocabulary in Reading - V4 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 18 | 3 | 5 | 4 | | 3 | 5 | | 5 | | 3 | 5 |
| WebArchiveTool - V1 | 3 | 5 | 4 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | <u>Outc ome</u> (a) | <u>Outc ome</u> (b) | <u>Outc ome</u> (c) | <u>Outc ome</u> (d) | <u>Outc ome</u> (e) | <u>Outc ome</u> (f) | <u>Outc ome</u> (g) | <u>Outc ome</u> (h) | <u>Outc ome</u> (i) | <u>Outc ome</u> (j) | <u>Outc ome</u> (k) |
| Mean | 3.08 | 5.00 | 4.00 | 4.72 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 |

APPENDIX G-7: Senior Project Assessment Results – Spring 2019

| | | | | | | | | | | | | |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
| CIS 4911 - Senior Project | | | Spring 2019 | | | | | | | | | |
| | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | |
| Project 1 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| Addigy Fin. Modeling Eng - V1 | 5 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 2 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| AmLight Learning - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 3 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| American Sign Lang - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 4 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| Assess Stud Online Engmnt - V1 | 3 | 5 | 5 | 2 | 3 | 5 | | 5 | 3 | 5 | 5 | |
| | | | | | | | | | | | | |
| Project 5 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| BOLO - V12 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 | |
| | | | | | | | | | | | | |
| Project 6 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| DataScience Workflow Mgr - V1 | 3 | 5 | 5 | 3 | 3 | 5 | | 5 | 4 | 4 | 5 | |
| | | | | | | | | | | | | |
| Project 7 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |
| Dev. User Interf. - BIM VA - v1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 | |
| | | | | | | | | | | | | |
| Project 8 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 | |

| | | | | | | | | | | | |
|--|---|---|---|---|---|---|--|---|---|---|---|
| Dig. Graduation & Reunion- V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 |
| | | | | | | | | | | | |
| Project 9 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| E Comm for EF for T - V1 | 5 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 10 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Envo Scholar - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 11 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Food Freq. Questionnaire - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 12 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Heavy Hanging Punch Bag - V1 | 3 | 5 | 5 | | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 13 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Interactive Smart Table - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 14 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| KeyBisc Cit Scient Proj App - V3 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 |
| | | | | | | | | | | | |
| Project 15 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| LMS in Facebook - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 16 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| MDC Animal | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |

| | | | | | | | | | | | |
|--|---|---|---|---|---|---|--|---|---|---|---|
| Cruelty Reg, - V1 | | | | | | | | | | | |
| Project 17 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| MDC Vacancy Compliance - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 18 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Min. insp. Min. in Comp. - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 19 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| ML Based Smart Outlet - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 20 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Mobile Judge - V12 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 21 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| NGADS Simulator - V1 | 5 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 22 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Patrol Shift Bid Scheduler - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| Project 23 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| PluMA A User Interface - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 |
| Project 24 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Restaurant Sumulation - V1 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 |

| | | | | | | | | | | | |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | | | | | | | | | |
| Project 25 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| SKOPE - Learn. w/ VAR - V7 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 4 | 4 | 5 |
| | | | | | | | | | | | |
| Project 26 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Snackability App - V3 | 5 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 27 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| SPARSE - V2 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 28 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Virtually Integrated Proj - V10 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| Project 29 | 3 | 5 | 5 | | 3 | 5 | | 5 | | 3 | 5 |
| Virtual Roll Call - V6 | 3 | 5 | 5 | 5 | 3 | 5 | | 5 | 5 | 3 | 5 |
| | | | | | | | | | | | |
| | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> | <u>Outcome</u> |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) |
| Mean | 3.14 | 5.00 | 5.00 | 4.82 | 3.00 | 5.00 | | 5.00 | 4.69 | 3.16 | 5.00 |

APPENDIX G-8:

Senior Project Assessment Results Summary – Summer 2017 to Spring 2019
Student Outcomes in CIS 4911 --- 2017-2019 cycle

| | | | | Mean Outcome Results | | | | | | | | | |
|-----------------------------------|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
| | # Proj ects | <u>Outc ome</u> (a) | <u>Outc ome</u> (b) | <u>Outc ome</u> (c) | <u>Outc ome</u> (d) | <u>Outc ome</u> (e) | <u>Outc ome</u> (f) | <u>Outc ome</u> (g) | <u>Outc ome</u> (h) | <u>Outc ome</u> (i) | <u>Outc ome</u> (j) | <u>Outc ome</u> (k) | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Sum mer 2017 | 18 | 3.06 | 5.00 | 4.00 | 4.78 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.06 | 5.00 | |
| Fall 2017 | 16 | 3.06 | 4.94 | 3.97 | 4.75 | 3.00 | 5.00 | | 4.97 | 5.00 | 3.00 | 5.00 | |
| Spri ng 2018 | 19 | 3.08 | 5.00 | 4.00 | 4.65 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 | |
| Sum mer 2018 | 6 | 3.08 | 5.00 | 4.00 | 5.00 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 | |
| Fall 2018 | 18 | 3.08 | 5.00 | 4.00 | 4.72 | 3.00 | 5.00 | | 5.00 | 5.00 | 3.00 | 5.00 | |
| Spri ng 2019 | 29 | 3.14 | 5.00 | 5.00 | 4.82 | 3.00 | 5.00 | | 5.00 | 4.69 | 3.16 | 5.00 | |
| | | | | | | | | | | | | | |
| Fina l Scor es | 106 | 3.09 | 4.99 | 4.27 | 4.77 | 3.00 | 5.00 | | 5.00 | 4.92 | 3.05 | 5.00 | |

APPENDIX H: Student Organization Reports

FIU-ACM Student Chapter Activities

2018 - 2019 ACM Annual Report

Association for Computing Machinery (ACM) at Florida International University (FIU) in Miami, Florida are the winners of the 2018-2019 ACM Student Chapter Excellence Awards in Chapter Activities. FIU's ACM student chapter, led by chapter president Rahul Mittal and executive committee members, organized many activities including student-led, faculty-led and industry-led workshops; volunteered at the FIU High School Programming Competition, MangoHacks, and launched undergraduate student research program. This is the second year in a row that FIU ACM has won this award. The chapter has engaged several hundred students. https://calendar.fiu.edu/event/mangohacks_2019#.Xc3xMS3MyRc

Rahul Mittal was awarded an Outstanding Sophomore Leadership Award. He is an active member of the Computer Science Honor Society, Upsilon Pi Epsilon, [Women in Computer Science](#), [Engineers without Borders](#), and has served as the president of the [Association for Computing Machinery](#), as well as, the president of the Academic Success Initiative within the School of Computing and Information Sciences. He has varied interests, deep passion and strong commitments which are exemplified through his commitment as a mentor in the MentorFIU program, president of Your Enlightened Side Plus, an organization promoting health and wellness on campus, and in his role as a resident assistant. Mittal also finds time to be part of the FIU University Choir. See <https://news.fiu.edu/2019/04/2019-outstanding-student-life-award-winners/132361>

2017 – 2018 ACM Annual Report

We had an amazing 2017-2018, with an average attendance of 28 people per meeting ACM was able to develop a regular audience to listen in to workshops, get involved and namely hone their skills in Computer Programming.

ACM was able to coordinate travel and promote hackathons to our members, planning carpools up north to Daytona at HackRiddle and even worked on getting FIU students on a free bus all the way to Georgia Tech.

With 9 events successfully executed, including the signature hacking event magohacks.com, we were able to have a great impact on students helping them secure internships and improving resumes. With events as simple as teaching students on how to use Git version control to being able to learn how to interview with companies. We were able to bring many concepts not taught in the classroom to engage with the growing hacker culture at FIU.

<https://news.fiu.edu/2018/mangohacks-building-code-for-fun-can-lead-to-students-landing-jobs>

Hacking with Amazon Alexa!

MLH LocalHost event: Hacking with Amazon Alexa is hosted by Women in Computer Science (WiCS) and the Association of Computing and Machinery (ACM). This workshop is designed for beginners interested in creating your first skill for Amazon Alexa, the voice service that powers the Amazon Echo. The presenter for this workshop is **Krista Shuckerow**, current President of ACM and WiCS member. Krista is an undergraduate student at FIU, majoring in Statistics and Economics with a minor in Computer Science.

<https://www.cis.fiu.edu/hacking-amazon-alexa/>

STARS Activities Report: Summer 2017 – Spring 2019

Overview: STARS now focuses all of its resources on being a service organization, offering high quality one-on-one peer tutoring for all CS/IT students. Our goal is to be available to students whenever they need assistance.

2017-2018:

- **Peer tutoring** available to all SCIS students covering multiple courses, with primary focus on Java programming, database, data structures, and networking. Tutors hold regular hours of availability in the various SCIS lab rooms for walk-in tutoring.
- **Volunteer peer tutoring** to students in other disciplines taking CGS service courses (CGS 2060, 2100, 2518), including one-on-one sessions, online help sessions, and exam review sessions
- **STARS tutors are available in every semester** including summer terms

2018-2019:

- **Peer tutoring** available to all SCIS students covering multiple courses, with primary focus on Java programming, database, data structures, and networking. Tutors hold regular hours of availability in the various SCIS lab rooms for walk-in tutoring.
- **Volunteer peer tutoring** to students in other disciplines taking CGS service courses (CGS 2060, 2100, 2518), including one-on-one sessions, online help sessions, and exam review sessions
- **STARS tutors are available in every semester** including summer terms
- **Summer 2109:** STARS offered the first-ever fully online tutoring services via the use of WhatsApp chat groups, to complement our on-campus services. Our initial course coverage focused on Java Programming 1, 2, and 3, plus data structures. Our hours of availability were expanded to weekends for the online tutoring. The response to online tutoring from students was overwhelmingly positive, citing both the high quality of the tutors and the easy availability of support without having to visit campus. Given the continuing expansion of fully online SCIS courses and degrees, we believe our online tutoring services will meet the needs of the geographically diverse students that SCIS now serves. As a result, the number of course support chat offerings will expand significantly in Fall of 2019, and STARS will focus solely on fully online tutoring.



Chapter Report (2017-2019)

Upsilon Pi Epsilon

Mu Chapter of Florida

Florida International University

<https://upe.cs.fiu.edu/>

The Florida International University chapter of Upsilon Pi Epsilon (UPE) had an incredibly successful period from Summer 2017 to Spring 2019, establishing itself as the premier organization for students majoring in the computing and information disciplines. As the only honor society in these fields of study, UPE's mission is to provide these students with a community that recognizes their academic achievements and promotes career development. The organization accomplishes this mission by offering a variety of programs and activities, through which students can gain knowledge, develop their skills, and kick-start their professional career.

2017-2018

Under the leadership of Chapter President Cesar Villa-Garcia, UPE has become home to the largest and most active group of students in the School of Computing and Information Sciences. To this end in the 2017-2018 academic year, the UPE chapter won the 2017-2018 FIU Outstanding Student Service Award and the UPE Outstanding National Chapter Award.

UPE hosted several activities such as information sessions, technical workshops, social events, outreach, and more. The information sessions included presentations from renowned companies such as Google, Microsoft, Amazon, Facebook, and Intel among others. Through these information sessions, students learned about their career opportunities and networked with company representatives.

Several activities hosted by UPE were coordinated by the various programs within UPE. These programs include: SparkDev Program, MentorFIU Program, Hackers Program, Google igniteCS Program and Discord HypeSquad Program.

Summer 2017:

During the summer UPE host few, if any, activities. The summer is used mainly for the preparation of the upcoming fall semester. In preparation for Fall 2017 the UPE's executive board (e-board) was planning ShellHacks, the first hackathon hosted by UPE.

Fall 2017:

In fall UPE hosted its first hackathon, ShellHacks, which brought together hundreds of students from around Florida. It was sponsored by many top companies, including Spotify, Amazon, Microsoft, Facebook, and others. ShellHacks was a tremendous success raising over \$50,000 in sponsorship money. Other activities included the following:

- General Body Meetings (3 meetings)
- Induction Ceremony (32 new members were inducted)
- Software & Hardware Development Programs, hosted many popular technical workshops for students including: web development, database management, mobile application development, among others. Through each of these workshops, hundreds of students were exposed to new technologies and used them to develop their own projects.
- Professional Development Programs included: Amazon Info Session, Microsoft Info Session, Facebook Info Session, and Google Info Session among others.
- Other activities included CodeFest Miami.

Spring 2018:

In spring UPE hosted the following signature events:

- General Body Meetings (3 meetings)
- Induction Ceremony (43 new members were inducted)
- Software & Hardware Development Program, hosted many popular technical workshops for students, similar to Fall 2017.
- Other activities included: Gaming Tournament, Town Hall Meeting, assisted with MangoHacks hackathon, the FIU Relay for Life, Engineering Expo, and, among others.
- Professional Development Programs included: Intel Info Session, GE Info Session, Spotify Info Session, and Professional Development Bootcamp among others.

During 2017-2018 UPE's Google igniteCS Program gave students the opportunity to promote computer science education and reach out to the community. Through the program, students currently visit 15 elementary and middle schools in Miami-Dade County every week, teaching about 500 students computer science. This program was initially funded by Google.

2018 -2019

Under the leadership of Chapter President Christopher Rodriguez, UPE continued to be the largest and most active group of students in the School of Computing and Information Sciences, as well as the largest and most active engineering student organization at Florida International University. As a result of Mr. Rodriguez's hard work and dedication to UPE he won the 2018 UPE Academic Achievement Award (\$1,500.00 Cash Award). In addition, the organization won the 2018-2019 UPE Outstanding National Chapter Award.

Several activities hosted by UPE were coordinated by the various programs within UPE. These programs include: SparkDev Program, MentorFIU Program, Hackers Program, Google igniteCS Program and Discord HypeSquad Program.

Summer 2018:

During the summer UPE hosted few, if any, activities. The summer is used mainly for the preparation of the upcoming fall semester. In preparation for Fall 2018 the UPE's executive board (e-board) was planning ShellHacks, the second edition of a hackathon hosted by UPE.

Fall 2018:

In fall UPE hosted the second edition of its hackathon, ShellHacks, which brought together over 700 students from around Florida and the USA. It was sponsored by many top companies, including Spotify, Amazon, Microsoft, Facebook, and others. ShellHacks was a tremendous success raising over \$80,000 in sponsorship money. Other activities included the following:

- General Body Meetings (3 meetings)
- Induction Ceremony (23 new members were inducted)
- Software, Hardware and Cyber Development Programs, hosted many popular technical workshops to help students explore different technologies, learn new technical skills, and apply these newly learned skills by engaging students with workshops. These workshops take place every week and are taught by industry, faculty, and senior students. These workshops included: including: GitHub and Software Development, Mobile Development Tech Talk, Web Development Workshop, Intro to InfoTech, Hardware Workshop, and Computer Networking Workshop, among others. Through each of these workshops, hundreds of students were exposed to new technologies and used them to develop their own projects.
- Professional Development Programs included: Amazon Info Session, Microsoft Info Session, Facebook Info Session, and Google Info Session among others.

Spring 2019:

In spring UPE hosted the following signature events:

- General Body Meetings (3 meetings)

- Induction Ceremony (54 new members were inducted)
- Beach Day
- Software, Hardware and Cyber Development Programs, hosted many popular technical workshops for students similar to Fall 2018.
- Other activities included: Gaming Tournament, Town Hall Meeting, assisted with MangoHacks hackathon, the FIU Relay for Life, Engineering Expo, and, among others.
- Professional Development Programs included: Intel Info Session, GE Info Session, Spotify Info Session, and Professional Development Bootcamp among others.

During 2018-2019 UPE's Google igniteCS Program continued to give students the opportunity to promote computer science education and reach out to the community. Through the program, students currently visit 15 elementary and middle schools in Miami-Dade County every week, teaching over 500 students computer science.

Activities of WICS Student Chapter Summer 2017 to Spring 2019

Fall 2017:

- Fall Kickoff Week
- CSO Club Fair
- First General Body Meeting
- SCIS Week of Welcome
- Microsoft Meet the Company + How to get a job in Tech workshop
- ShellHacks Breaking the Glass Ceiling Challenge
- Second General Body Meeting
- Grace Hopper Celebration Panel
- SCIS x COB Student Presentations and Panel on Entrepreneurship
- Virtual Reality Workshop
- CodeFest Big Sisters Mentorship
- WICS Retreat - Universal Orlando
- Super Smash Bros Gaming Tournament co-hosted with UPE
- Final General Body Meeting

Spring 2018:

- CSO Club Fair
- First General Body Meeting
- WICS Wednesdays: On Wednesday we write code
- MangoHacks Ladies Storm Hackathons
- Hacking with Amazon Alexa workshop
- FIU Engineering Expo
- WICS Game Night
- College of Engineering Club Fair
- Google G-Suite workshop
- Second General Body Meeting
- Soldering workshop
- UPE x FIU Mentorship Program
- Miami Maker Faire
- ASI Study Night
- LinkedIn Workshop
- Microsoft College Code Competition
- Final General Body Meeting + MLH Hack the Tech Interview: Algorithms Practice workshop
- Tech Summer Camp workshop

Summer 2018:

- Girls Who Code Panel
- FIU SCIS TweetChat

Fall 2018:

- Fall Kickoff Week
- CSO Club Fair
- Professional Headshots and Resume Review
- First General Body Meeting
- Intern Networking
- ShellHacks Diversity and Inclusion Challenge
- Second General Body Meeting
- Grace Hopper Celebration Mingle
- CodeFest Big Sisters Mentorship
- Final General Body Meeting

Spring 2019:

- Spring Kickoff Week
- First General Body Meeting
- WICS Crushing Your Interview workshop
- Resume Jam
- FIU Engineering Expo
- Soldering workshop
- Second General Body Meeting
- Miami Maker Faire
- WICSCON: “This is what a programmer looks like” conference
- Final General Body Meeting

Activities of the FIU Programming Team

Summer 2017 to Spring 2019

With support from and the organizational support of the Academy for CS Education, the FIU programming team has continued to flourish. The teams have received scholarships, weekly tutorials, training sessions, weekly mock competitions, travel to attend coaching camps and retreats, and master classes by visiting expert coaches. Most programming team member have served an internship at Ultimate Software, Google, Apple, Uber, and more. Many have since become full time employees at their interning companies. Other team members have enrolled in graduate studies.

During the 2017-2018 year, \$17,480 were awarded in scholarships to team members. Prof. Giri Narasimhan, the team head coach, took a group of FIU team members to a highly selective competition problem solving workshop in Spain taught by the coaches of the world's best programming teams from Russia. During the 2018-19 year, \$14,000 were awarded in scholarships to team members. In the summer of 2019, a 5-day training camp for competition problem solving was held on the campus of FIU in partnership with the programming team from UNAL, Bogota, Colombia.

Starting from 2017, FIU has become the first South Florida site for the **ACM Regional Programming Competition**. The competition is organized by the Academy for CS Education with FIU undergraduate and graduate student volunteers. The site directors have been Profs. Kip Irvine and Giri Narasimhan. The competition brings about 20-30 teams from across S. Florida to FIU's campus from across the southeastern states.

In 2017, FIU competed in Division 1, and was placed 13th, 21st, and 28th. In 2018, FIU competed in Division 2 and ranked 2nd. In 2019, the FIU teams competed in Division 1 and ranked 17th, 19th and 25th.

Ultimate Software has financially supported the activities of the Academy and the Programming Team for over a decade. This year, FaceBook became an official sponsor of FIU's programming teams.

In Spring of each year, the Academy hosts the Annual **FIU High School Programming Competition**, attended by about 40 teams from Florida high schools, the largest competition of its kind in South Florida.

Other related activities sponsored by the Academy for CS Education include the middle school and high school VEX robotics competitions.

Appendix-I: Minutes of SCIS Industrial Advisory Board Meetings

**INDUSTRY ADVISORY BOARD
Florida International University
School of Computing and Information Sciences**

Board Meeting Actions and Summary (DRAFT)

Dec. 1st, 2017

Florida International University

Miami, FL

Board Member Attendance:

- Dr. Roy Gerber, IAB Vice Chair and Chief Technology Officer, Candidate.Guru
- Jaime Borrás, CEO, Wireless Silicon Group, and Senior Fellow, Motorola Mobile Devices
- Juan Caraballo, Director, Global University Programs IBM Corp.
- Christopher Fleck, Vice President, Emerging Solutions Citrix
- David Martinez, Associate Head, MIT Lincoln Lab
- Thomas Packert, Chief Information Officer, CareTrader
- Bert Sylvestre, Vice President Business Development, Pro Logic Systems

FIU Representation:

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Dr. Jason Liu, Associate Professor, FIU SCIS
- Col. Jerry Miller, Discovery Lab, FIU SCIS
- Dr. Mario Eraso, STEM Coordinator, FIU SCIS
- Steven Luis, Director of Technology and Business Relations, FIU SCIS

Board Meeting Summary

1. Dr. Gerber begins the meeting at 5:03 pm.
2. Dr. Gerber welcomes Board members and asks members to introduce themselves.
3. Dr. Iyengar presents his report to the Board (see materials.)
 - a. Dr. Iyengar starts by stating our goal as a school is to create the next generation of computer scientists. He comments on the challenge of research and curriculum to keep pace with the changes in technology.
 - b. He speaks about the ranking of the School and the impact our faculty and graduate students are having.
 - c. He discusses the importance of NSF expenditures towards our rankings.
 - d. Dr. Iyengar discusses our ABET accreditation process.
 - e. He speaks to a number of awards our faculty, students and advising team have achieved.
 - f. He points out the Hackathons the students are running and how that is bringing companies on campus to recruit.
 - g. Dr. Iyengar speaks about the REU Site which attracts students from other universities to FIU.
4. Senior Project/VIP Highlight Presentations (see vip.fiu.edu)
 - a. Students provide details about their projects and receive feedback from board member.
5. Dr. Jason Liu presents his research activities. (See materials)
 - a. Dr. Liu discusses his work in the area of large-scale network simulation.
 - b. Board members provide feedback.
6. Dr. Gerber asks Board members for their general feedback for the meeting.
 - a. Dr. Gerber points out the importance of PhD production at a research dept. Also comments on how we are recruiting local students into PhD program.
 - b. Mr. Sylvestre notes the increase in research and other funding and how this is changing the school.
 - c. Mr. Sylvestre comments on the student projects and how many of these are solving real business problems. He also stated his interest in seeing more interdisciplinary projects.
 - d. Mr. Caraballo responds by saying the difficulty is helping the students understand the domain knowledge and building the project at the same time is challenging.
 - e. Mr. Gerber suggests involving other depts in the senior project and create joint projects that have domain team members and developers.
 - f. Mr. Caraballo noted that the Senior Projects are followed by Startup FIU and there is some interest to engage.
 - g. Mr. Caraballo also commented that there are new technologies such as block chain which should be included in these projects.
 - h. Mr. Borrás seconded the thought to incorporate such new technologies. He strongly feels that senior project should be incorporating emerging technology trends.
 - i. Mr. Fleck spoke about the needs for ethics in the program as a way to address the rising problem of cybersecurity. He commented that the school had made good progress overall.
 - j. Mr. Packert commented that each time he sees the student projects he is impressed how cleaner and neater the project is. He commented on the value of building into the curriculum standards frameworks to address the changes in technology.

- k. Board members comment on possible educational solutions for providing additional training to students via certifications.
- 7. Mr. Luis discusses potential dates with Board members for the next meeting. The next meeting will align with the next Senior Project Showcase that is tentatively Friday, April 20th.
- 8. Dr. Gerber makes his final remarks again thanking Board members for attending.
- 9. Dr. Gerber closes the meeting at 7:57pm.

Summary of Board Actions

- 1. 4/29/11: Board members offer to assist school reach out to local companies to broaden participation in the school development. Terremark and Cruise Lines are suggested as the first companies to approach. School to obtain FIU Foundation approval to begin discussions with these companies. Continue development with incoming Director. 9/16/11: We have Foundation approval to open discussion with RCL. 12/2/12: Foundation has given approval to approach RCL. 4/27/12: Mr. Silvestre will reach out to RCCL for interest to participate on the Board. 9/14/12: Mr. Silvestre presented two new Board members from RCCL: Max Schmidt and Jose Machado. 12/7/13: Dr. Gerber introduces new Board member Thomas Packert, VP of Information Management, Orthosenor. 4/21/17: David Martinez MIT Lincoln Lab is introduced to the Board. Board members continue to pursue potential Board member prospects.

Summary of Closed/Tabled Actions

- 1. **FL Governor Discussion:** 8/19/05: Mr. Braun has requested Dr. Deng investigate the cost of a study to better understand IT employment attraction and retention issues in South Florida. The study will be used as a basis for a discussion with Florida's Governor, Mr. Braun, Board members and Dr. Maidique/FIU. 12/9/05: The cost for the IT employment study request by Mr. Braun is \$60K. The Board defers this item to Mr. Braun for further discussion. 5/26/06: Board members expressed concern regarding the \$60K needed to conduct the survey. Board members agreed to postpone discussion on action until next Governor takes office.
Board Action: 12/09/05 Tabled, till 2007.
- 2. **Industry Center:** 8/19/05: The Board supports the new direction for boot-strapping funding for an industry center by creating an "umbrella" of research projects that members can fund and/or pursue funding joint funding from Federal agencies. The Board requests to be informed with progress in this area. 12/9/05: The school and Board members are having ongoing discussions regarding joint projects and funding opportunities. The LA Grid Program is the outcome of conversations with IBM. The school will update Board members going forward. *Board Action: 12/09/05 Closed*

3. Marketing: 8/19/05: The Board requests that the school develop marketing materials to promote FIU, the school and its accomplishments. The Board suggests that this effort occur jointly with member companies with the goal of producing joint press releases. Mr. Braun offers the assistance of his staff for developing marketing and communications strategy. Mr. Braun felt that the marketing materials would be useful for recruiting new board members as well. Mr. Borrás has also offered marketing assistance. Dr. Prasad is hiring a publications/publicity staff member. Mr. Braun suggests that the three of these staff members meet to coordinate marketing efforts. The timing for this effort will depend on the resolution of the reorganization. 12/09/05: Ms. Santana offers assistance with marketing effort. School is working on new marketing materials and will follow-up with companies reporting progress as requested.

Board Action: 12/09/05 Closed

4. NSF Award: 8/19/05: Mr. Braun requests that if NSF awards the School with the BPC grant, the school should prepare joint press releases to promote the award to the community. 12/9/05: Grant was denied. Reviewer's comments were positive. School to reapply in Spring '06. School will update Board on progress.

Board Action: 12/09/05 Closed

5. LA Grid: 8/19/05: The Board expresses approval of the LA Grid initiative, a partnership between IBM, FIU and other universities. The Board asks to be kept informed of the activity. 12/9/05: Pete Martinez provides Board with overview of the LA Grid Program. School will update Board on progress.

Board Action: 12/09/05 Closed

6. Board Action Procedures: 12/9/05: The Board discussed several procedural mechanisms to process action items with the goal of closing action items out expeditiously. These procedures are:

- a. Once attending Board members, those present at the current meeting, decide to close an item it no longer needs to be discussed.
- b. If an action plan is put in place for a Board action item, the item should be closed. The party taking responsibility for the action plan should report to the Board periodically on the outcomes of the plan.
- c. It is sufficient for action to be taken on any agenda item by the attending Board members.
- d. Actions items accepted by the Board should establish a time limit with the understanding that action should be taken within that time or should be closed.
- e. The school will implement these procedures at upcoming meetings.

Board Action: 12/09/05 Closed

7. IT Industry Scholarship Fund: 12/9/06: The Board agreed to review a proposal by Dr. Deng to develop an industry-based funding mechanism for student scholarships to attract high quality

students. Dr. Deng will develop the proposal and distribute to Board members as soon as possible. A conference call should be scheduled thereafter to discuss the proposal. 5/25/06: Board members agreed to pursue the Scholarship Fund Campaign. Mr. Luis prepared and distributed materials for Board members to discuss with their colleagues. 04/07: Tabled to obtain more Board member feedback and direction.

Board Action: 12/09/05 Open, pending review

- 8. Business Continuity Information Network:** 12/07: Mr Braun suggests to Board members to reach out to their peers and networks to facilitate support. Board interested in sending letter of support on behalf of Centers of Excellence to lobby Gov. Board. Not pursued due to lobby rule limitations.

- 9. Board Chair:** 9/12/08: Pete Martinez nominated and with a unanimous vote of the Board is elected as Board Chair. Dr. Meleis steps down as Board Vice-Chair. Mr. Martinez to nominate a Vice-Chair. 12/5/08: Dr. Roy Gerber is appointed Board Vice Chair. Closed

- 10. School Move:** 12/4/09: Mr. Gerber receives a motion from the Board to create a draft letter to circulate to the Board member for comment/signature expressing concern for moving the School to the Engineering Center building. A letter was drafted, circulated, signed and delivered to FIU Provost in Dec. 2009. Provost responded by stating that the School's future success is paramount in his decision and that the Board will be consulted before any decisions are made. *Closed.*

- 11. Student Mentoring:** 9/12/08: Mr. Martinez proposes and the Board members agree to support a Student Mentoring program whereby each Board members would become a mentor of a student of the school. Mr. Martinez asks that a list of potential student candidates be drawn up. 12/5/08: Mr. Luis provides Board with resumes of students interested in the Mentoring program via web location of Board Materials. 9/10/10: Mr. Borrás receives first student to mentor. *Ongoing*

- 12. Board Membership:** 8/19/05: The Board has identified 8 companies to pursue for Board membership. The Board has set as a goal to have 15 total members. FIU will work with Mr. Braun to further communicate (via letter/phone) with non-active board members and potential members we would ask to join. Board members are encouraged to participate in the recruitment process. 12/9/05: Nick Bowen/IBM and Armando Garcia/IBM withdraw from the Board. Pete Martinez is added. Board members agree to pursue 4 additional members. Dr. Meleis will contact Citrix. Pete Martinez will contact Telefonica. Mr. Braun has made initial contact with Global Crossing, requires follow-up. FIU will continue discussions with PBS&J. 5/26/06: Dr. Meleis invited Mr. Cristinziano, Citrix VP, who accepted invitation. Also, Board members agreed that the Board should become larger before developing sub-committees. 12/15/06: Mr. Cristinziano steps down due to relocation. 2/26/07: Conf. Call, two new Board members are introduced, Mr. Pallin and Mr. Buchenhorner, three additional members are begin sought by April Meeting. Membership stands at 12. 4/07: Board affirms that 15 members are sought by next meeting. Dr. Meleis suggested that the Board review the objectives of the Board to assist in identifying additional members to recruit. 9/07: Three

new Board members are introduced, Mr. Bravo/Microsoft, Mr. Fleck/Citrix and Mr. Ugale/Crossbow Ventures. Dr. Meleis proposed that the Board finalize objectives and create committees to work on Board objectives. 12/07: Mr. Braun requests further information about the objectives of the school going forward to better align with Board committee development. Item deferred to next meeting.
Board Action: 12/9/05, closed

- 13. Committees:** 9/12/08: Mr. Martinez proposes and the Board passes the creation of two committees: Research and Talent Development. The Research Committee will help the school align its resources with Federal, State and local strategic investments and funding opportunities from the private and public sector. The Talent Development Committee will assist the school to develop programs to enhance student research and education experiences, further driving the competitiveness of our students. 12/5/08: Committees to meet via conf. call to formulate goals and actions. *Closed*
- 14. BS in Computer Science Program Educational Objectives and Student Outcomes:** 12/10/10: Dr. Navlakha presented the modified outcomes for the BS-CS program, and the Board unanimously concurred with the suggested modifications. The documents are available with Board materials. **CLOSED**
- 15. CS Senior Projects:** 12/10/10 : Board members request that there be regular presentations from Senior Project students. The dialog is beneficial for both industry and school. Student presentations will be evaluated for Fall and Spring agenda based on quality and relative interest of the board. **CLOSED**
- 16. Technology Transfer Initiative:** 9/10/10: Board members approve of the School's efforts to assist faculty and students accelerate the IP development process by improving licensing options, expediting IP review process, and providing pre-incubator technical and business support. Board members offer to provide further guidance. Mr. Luis to contact Board members with next steps. **CLOSED**
- 17. Collaborative Open Innovation Lab:** 4/29/11: Board members express interest to participate as COIL mentors. Program is awaiting final approval. Mr. Luis to provide information to the Board regarding mentoring opportunity. 9/16/11: Waiting for final approval of program via External Programs/University College. 12/2/11. Mr. Luis updates Board members that the COIL program has started activities. **CLOSED**
- 18. National Rankings:** 9/16/11: Board members request to know the key metrics the school is tracking for improving national ranking. 12/2/11: Dr. Iyengar discusses rankings in his presentation. The NRC ranking is not due for another three years. **CLOSED**
- 19. Intellectual Property:** 9/16/11: Board members request to know more about intellectual property/patents efforts in the school. 12/2/11: Dr. Iyengar and Mr. Luis present information about IP at FIU. No further action is requested. **CLOSED**
- 20.** 12/2/12: Board Members have requested that the School begin tracking where its graduates are finding jobs and report back on findings periodically. 4/27/12: A survey of recent graduates was presented and an Alumni listing which is posted on the website is started. Updates will continue and reports given to the Board periodically. **CLOSED.**
- 21.** 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey. Employment Survey presented at 12/02/16 meeting. See materials for details.

**INDUSTRY ADVISORY BOARD
Florida International University
School of Computing and Information Sciences**

Board Meeting Actions and Summary (DRAFT)

April 20th, 2018

Florida International University

Miami, FL

Board Member Attendance:

- Pete Martinez, IAB Chair, Chairman and CEO, Game Changer Tec, LLC
- Jaime Borrás, CEO, Wireless Silicon Group, and Senior Fellow, Motorola Mobile Devices
- Juan Caraballo, Director, Global University Programs IBM Corp.
- Christopher Fleck, Vice President, Emerging Solutions Citrix
- David Martinez, Associate Head, MIT Lincoln Lab
- Thomas Packert, Chief Information Officer, CareTrader
- Bert Sylvestre, Vice President Business Development, Pro Logic Systems

FIU Representation:

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Dr. Mark Finlayson, Assistant Professor, FIU SCIS
- Steven Luis, Director of Technology and Business Relations, FIU SCIS

Board Meeting Summary

10. Mr. Martinez begins the meeting at 5:13 pm.
11. Mr. Martinez makes his opening remarks. He expresses his appreciation for the support the Board members are showing by attending the meeting on a Friday night. He states that the school is on a tremendous trajectory and that the Board members are providing a level of guidance. He states that there are opportunities to commercialize the science being developed and to monetize the knowledge obtained from it. That it is more than publishing that matters and that the use of technology in business is the impact desired.
12. Dr. Iyengar presents his report to the Board (see materials.)
 - a. Dr. Iyengar begins by describing the culture of the school which includes awarding excellence in research and teaching. The efforts of the faculty are transformative and that they have a global research.
 - b. Dr. Iyengar speaks about the variety of outstanding students of the school. Dr. Iyengar talks about the school's women students and those student with entrepreneurship desires.
 - c. Dr. Iyengar presents various metrics regarding enrollment, degree awards and patents.
 - d. Dr. Iyengar asks Mr. Luis to speak about the FIRE 360 training simulator as an example of school innovation project.
 - i. Board members comment on the value of the project and its potential.
13. Senior Project/VIP Highlight Presentations (see vip.fiu.edu)
 - a. Students provide details about their projects and receive feedback from board member.
14. Dr. Mark Finlayson presents his research activities. (See materials)
 - a. Dr. Finlayson discusses his work in the machine understanding and narrative.
 - b. Board member provide feedback. Board members comment on the senior project Dr. Finlayson's students have accomplished and their connection the MIT Lincoln Lab.
 - c. Mr. Caraballo states how IBM feels Dr. Finalyson's work is ahead of the curve.
 - d. Several board members comment on the application of his work in industries like Cyber and machine intelligence.
15. Mr. Martinez asks Board members for their general feedback for the meeting.
 - a. Mr. Packert states the projects have reached a tipping point, the quality and substance of the projects are getting better and better.
 - b. Mr. Borrás thanks the students for a great job. He challenges the school to keep up with the changing technology. He suggests working on updating curriculum or offering special topics as suggested by Dr. Iyengar.
 - c. Dr. Iyengar speaks about how there are many distinguished speakers invited to the school and expose our students to the latest trends.
 - d. Mr. Borrás continues to state other technology areas to pursue are block chain and quantum computing.
 - e. Mr. Sylvestre suggests the school work on becoming better known within the local industry. He suggests reaching out to professional groups and meetups. Perhaps present at local developer conferences. It is important to create a buzz about the School and the work it is doing.
 - f. Mr. Caraballo thanks the students for their work. Working with the students he knows how much effort they put into their projects. He is very impressed with the incredible projects they pursue.

- g. Mr. Fleck comments that the school keeps setting the bar higher. He points out how relevant the projects are to industry needs. He reminds Board members about projects mentored by local company Addigy and how the project help to find talent for his company.
 - h. Mr. Sylvestre continues this thought by pointing out the local tech industry in Miami and how they are struggling to find talent. These companies need to participate to see the benefits.
16. Mr. Luis discusses potential dates with Board members for the next meeting. The next meeting will align with the next Senior Project Showcase that is tentatively Friday, November 30th.
 17. Mr. Martinez makes his final remarks again thanking Board members for attending.
 18. Mr. Martinez closes the meeting at 8:07pm.

Summary of Board Actions

2. 4/29/11: Board members offer to assist school reach out to local companies to broaden participation in the school development. Terremark and Cruise Lines are suggested as the first companies to approach. School to obtain FIU Foundation approval to begin discussions with these companies. Continue development with incoming Director. 9/16/11: We have Foundation approval to open discussion with RCL. 12/2/12: Foundation has given approval to approach RCL. 4/27/12: Mr. Silvestre will reach out to RCCL for interest to participate on the Board. 9/14/12: Mr. Silvestre presented two new Board members from RCCL: Max Schmidt and Jose Machado. 12/7/13: Dr. Gerber introduces new Board member Thomas Packert, VP of Information Management, Orthosenor. 4/21/17: David Martinez MIT Lincoln Lab is introduced to the Board. Board members continue to pursue potential Board member prospects.

Summary of Closed/Tabled Actions

22. **FL Governor Discussion:** 8/19/05: Mr. Braun has requested Dr. Deng investigate the cost of a study to better understand IT employment attraction and retention issues in South Florida. The study will be used as a basis for a discussion with Florida's Governor, Mr. Braun, Board members and Dr. Maidique/FIU. 12/9/05: The cost for the IT employment study request by Mr. Braun is \$60K. The Board defers this item to Mr. Braun for further discussion. 5/26/06: Board members expressed concern regarding the \$60K needed to conduct the survey. Board members agreed to postpone discussion on action until next Governor takes office.
Board Action: 12/09/05 Tabled, till 2007.
23. **Industry Center:** 8/19/05: The Board supports the new direction for boot-strapping funding for an industry center by creating an "umbrella" of research projects that members can fund and/or pursue funding joint funding from Federal agencies. The Board requests to be informed with progress in this area. 12/9/05: The school and Board members are having ongoing discussions regarding joint projects and funding opportunities. The LA Grid Program is the outcome of

conversations with IBM. The school will update Board members going forward. *Board Action: 12/09/05 Closed*

24. Marketing: 8/19/05: The Board requests that the school develop marketing materials to promote FIU, the school and its accomplishments. The Board suggests that this effort occur jointly with member companies with the goal of producing joint press releases. Mr. Braun offers the assistance of his staff for developing marketing and communications strategy. Mr. Braun felt that the marketing materials would be useful for recruiting new board members as well. Mr. Borrás has also offered marketing assistance. Dr. Prasad is hiring a publications/publicity staff member. Mr. Braun suggests that the three of these staff members meet to coordinate marketing efforts. The timing for this effort will depend on the resolution of the reorganization. 12/09/05: Ms. Santana offers assistance with marketing effort. School is working on new marketing materials and will follow-up with companies reporting progress as requested.

Board Action: 12/09/05 Closed

25. NSF Award: 8/19/05: Mr. Braun requests that if NSF awards the School with the BPC grant, the school should prepare joint press releases to promote the award to the community. 12/9/05: Grant was denied. Reviewer's comments were positive. School to reapply in Spring '06. School will update Board on progress.

Board Action: 12/09/05 Closed

26. LA Grid: 8/19/05: The Board expresses approval of the LA Grid initiative, a partnership between IBM, FIU and other universities. The Board asks to be kept informed of the activity. 12/9/05: Pete Martinez provides Board with overview of the LA Grid Program. School will update Board on progress.

Board Action: 12/09/05 Closed

27. Board Action Procedures: 12/9/05: The Board discussed several procedural mechanisms to process action items with the goal of closing action items out expeditiously. These procedures are:

- a. Once attending Board members, those present at the current meeting, decide to close an item it no longer needs to be discussed.
- b. If an action plan is put in place for a Board action item, the item should be closed. The party taking responsibility for the action plan should report to the Board periodically on the outcomes of the plan.
- c. It is sufficient for action to be taken on any agenda item by the attending Board members.
- d. Actions items accepted by the Board should establish a time limit with the understanding that action should be taken within that time or should be closed.
- e. The school will implement these procedures at upcoming meetings.

Board Action: 12/09/05 Closed

28. IT Industry Scholarship Fund: 12/9/06: The Board agreed to review a proposal by Dr. Deng to develop an industry-based funding mechanism for student scholarships to attract high quality students. Dr. Deng will develop the proposal and distribute to Board members as soon as possible. A conference call should be scheduled thereafter to discuss the proposal. 5/25/06: Board members

agreed to pursue the Scholarship Fund Campaign. Mr. Luis prepared and distributed materials for Board members to discuss with their colleagues. 04/07: Tabled to obtain more Board member feedback and direction.

Board Action: 12/09/05 Open, pending review

- 29. Business Continuity Information Network:** 12/07: Mr Braun suggests to Board members to reach out to their peers and networks to facilitate support. Board interested in sending letter of support on behalf of Centers of Excellence to lobby Gov. Board. Not pursued due to lobby rule limitations.
- 30. Board Chair:** 9/12/08: Pete Martinez nominated and with a unanimous vote of the Board is elected as Board Chair. Dr. Meleis steps down as Board Vice-Chair. Mr. Martinez to nominate a Vice-Chair. 12/5/08: Dr. Roy Gerber is appointed Board Vice Chair. Closed
- 31. School Move:** 12/4/09: Mr. Gerber receives a motion from the Board to create a draft letter to circulate to the Board member for comment/signature expressing concern for moving the School to the Engineering Center building. A letter was drafted, circulated, signed and delivered to FIU Provost in Dec. 2009. Provost responded by stating that the School's future success is paramount in his decision and that the Board will be consulted before any decisions are made. *Closed.*
- 32. Student Mentoring:** 9/12/08: Mr. Martinez proposes and the Board members agree to support a Student Mentoring program whereby each Board members would become a mentor of a student of the school. Mr. Martinez asks that a list of potential student candidates be drawn up. 12/5/08: Mr. Luis provides Board with resumes of students interested in the Mentoring program via web location of Board Materials. 9/10/10: Mr. Borrás receives first student to mentor. *Ongoing*
- 33. Board Membership:** 8/19/05: The Board has identified 8 companies to pursue for Board membership. The Board has set as a goal to have 15 total members. FIU will work with Mr. Braun to further communicate (via letter/phone) with non-active board members and potential members we would ask to join. Board members are encouraged to participate in the recruitment process. 12/9/05: Nick Bowen/IBM and Armando Garcia/IBM withdraw from the Board. Pete Martinez is added. Board members agree to pursue 4 additional members. Dr. Meleis will contact Citrix. Pete Martinez will contact Telefonica. Mr. Braun has made initial contact with Global Crossing, requires follow-up. FIU will continue discussions with PBS&J. 5/26/06: Dr. Meleis invited Mr. Cristinziano, Citrix VP, who accepted invitation. Also, Board members agreed that the Board should become larger before developing sub-committees. 12/15/06: Mr. Cristinziano steps down due to relocation. 2/26/07: Conf. Call, two new Board members are introduced, Mr. Pallin and Mr. Buchenhorner, three additional members are begin sought by April Meeting. Membership stands at 12. 4/07: Board affirms that 15 members are sought by next meeting. Dr. Meleis suggested that the Board review the objectives of the Board to assist in identifying additional members to recruit. 9/07: Three new Board members are introduced, Mr. Bravo/Microsoft, Mr. Fleck/Citrix and Mr. Ugale/Crossbow Ventures. Dr. Meleis proposed that the Board finalize objectives and create committees to work on Board objectives. 12/07: Mr. Braun requests further information about the objectives of the school going forward to better align with Board committee development. Item deferred to next meeting.

Board Action: 12/9/05, closed

- 34. Committees:** 9/12/08: Mr. Martinez proposes and the Board passes the creation of two committees: Research and Talent Development. The Research Committee will help the school align its resources with Federal, State and local strategic investments and funding opportunities from the private and public sector. The Talent Development Committee will assist the school to develop programs to enhance student research and education experiences, further driving the competitiveness of our students. 12/5/08: Committees to meet via conf. call to formulate goals and actions. *Closed*
- 35. BS in Computer Science Program Educational Objectives and Student Outcomes:** 12/10/10: Dr. Navlakha presented the modified outcomes for the BS-CS program, and the Board unanimously concurred with the suggested modifications. The documents are available with Board materials. **CLOSED**
- 36. CS Senior Projects:** 12/10/10 : Board members request that there be regular presentations from Senior Project students. The dialog is beneficial for both industry and school. Student presentations will be evaluated for Fall and Spring agenda based on quality and relative interest of the board. **CLOSED**
- 37. Technology Transfer Initiative:** 9/10/10: Board members approve of the School's efforts to assist faculty and students accelerate the IP development process by improving licensing options, expediting IP review process, and providing pre-incubator technical and business support. Board members offer to provide further guidance. Mr. Luis to contact Board members with next steps. **CLOSED**
- 38. Collaborative Open Innovation Lab:** 4/29/11: Board members express interest to participate as COIL mentors. Program is awaiting final approval. Mr. Luis to provide information to the Board regarding mentoring opportunity. 9/16/11: Waiting for final approval of program via External Programs/University College. 12/2/11. Mr. Luis updates Board members that the COIL program has started activities. **CLOSED**
- 39. National Rankings:** 9/16/11: Board members request to know the key metrics the school is tracking for improving national ranking. 12/2/11: Dr. Iyengar discusses rankings in his presentation. The NRC ranking is not due for another three years. **CLOSED**
- 40. Intellectual Property:** 9/16/11: Board members request to know more about intellectual property/patents efforts in the school. 12/2/11: Dr. Iyengar and Mr. Luis present information about IP at FIU. No further action is requested. **CLOSED**
- 41.** 12/2/12: Board Members have requested that the School begin tracking where its graduates are finding jobs and report back on findings periodically. 4/27/12: A survey of recent graduates was presented and an Alumni listing which is posted on the website is started. Updates will continue and reports given to the Board periodically. **CLOSED.**
- 42.** 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey. Employment Survey presented at 12/02/16 meeting. See materials for details.

**INDUSTRY ADVISORY BOARD
Florida International University
School of Computing and Information Sciences**

Board Meeting Actions and Summary (DRAFT)

November 30th, 2018

Florida International University

Miami, FL

Board Member Attendance:

- Pete Martinez, IAB Chair, Chairman and CEO, Game Changer Tec, LLC
- Jaime Borrás, CEO, GeoToll and Senior Fellow, Motorola Mobile Devices
- Juan Caraballo, Director, Global University Programs IBM Corp.
- Christopher Fleck, Vice President, Emerging Solutions Citrix
- David Martinez, Associate Head, MIT Lincoln Lab
- Thomas Packert, Owner, Phase 1 Systems

FIU Representation:

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Dr. Nagarajan Prabakar, Associate Professor, FIU SCIS
- Dr. Endadul Hoque, Assistant Professor, FIU SCIS
- Dr. Mario Eraso, STEM Coordinator, FIU SCIS
- Steven Luis, Director of Technology and Business Relations, FIU SCIS

Board Meeting Summary

19. Mr. Martinez begins the meeting at 5:09 pm.
20. Mr. Martinez in his opening remarks.
 - a. Mr. Martinez remarks that the school is not only creating talent and technology but that the quality of the results are excellent. The school is creating alumni that are having an impact locally.
 - b. He mentions the variety of computing challenges and how the School can make an impact by focusing its efforts in these areas such as self-driving cars and genetics.
21. Dr. Iyengar presents his report to the Board (see materials.)
 - a. Dr. Iyengar welcomes Board members and also thanks Dave Martinez for his AI lecture.
 - b. Dr. Iyengar reviews the Schools accomplishments and metrics.
 - c. He introduces the expected new faculty for Fall 2019.
 - d. He discusses the importance of 4 year graduation rate.
 - i. Board members discuss the challenges and the importance of internships during this period.
 - e. Dr. Iyengar and the Board discuss challenges for CS women, minorities and those with disabilities.
22. Senior Project/VIP Highlight Presentations (see vip.fiu.edu)
 - a. Students provide details about their projects and receive feedback from board member.
23. Dr. Endadul Hoque presents his research activities. (See materials)
 - a. Dr. Hoque describes his work in the field of network security.
 - b. Board members discuss the application of his work in the industry. Board members remark on where the research is heading and the impact of AI. Board members discuss a concept where FIU provides device testing lab to help with the device's network security.
24. Mr. Martinez asks Board members for their general feedback for the meeting.
 - a. Mr. Dave Martinez complements the students for the quality of their presentations. And even more so the ability the have to present.
 - b. Mr. Caraballo states that he would like to see more board members from local area companies such as SouthCom, Miami Dade County CIO, Carnival, etc.
 - c. Mr. Fleck commented on the relevance of the projects. Issues like cloud security are extremely important. Tools are needed to identify anomalous patterns.
 - d. Mr. Packert expressed how impressed he continues to be regarding the projects presented. He and board members continue discussion on cybersecurity and the need to focus on these areas.
 - e. Mr. Borrás discusses new business models will emerge as a result of cybersecurity issues such as insurance specifically for cyber related losses.
25. Mr. Luis discusses potential dates with Board members for the next meeting. The next meeting will align with the next Senior Project Showcase that is tentatively Friday, April 19th.
26. Mr. Martinez makes his final remarks again thanking Board members for attending.
27. Mr. Martinez closes the meeting at 8:10pm.

Summary of Board Actions

3. 4/29/11: Board members offer to assist school reach out to local companies to broaden participation in the school development. Terremark and Cruise Lines are suggested as the first companies to approach. School to obtain FIU Foundation approval to begin discussions with these companies. Continue development with incoming Director. 9/16/11: We have Foundation approval to open discussion with RCL. 12/2/12: Foundation has given approval to approach RCL. 4/27/12: Mr. Silvestre will reach out to RCCL for interest to participate on the Board. 9/14/12: Mr. Silvestre presented two new Board members from RCCL: Max Schmidt and Jose Machado. 12/7/13: Dr. Gerber introduces new Board member Thomas Packert, VP of Information Management, Orthosenor. 4/21/17: David Martinez MIT Lincoln Lab is introduced to the Board. Board members continue to pursue potential Board member prospects.

Summary of Closed/Tabled Actions

- 43. FL Governor Discussion:** 8/19/05: Mr. Braun has requested Dr. Deng investigate the cost of a study to better understand IT employment attraction and retention issues in South Florida. The study will be used as a basis for a discussion with Florida's Governor, Mr. Braun, Board members and Dr. Maidique/FIU. 12/9/05: The cost for the IT employment study request by Mr. Braun is \$60K. The Board defers this item to Mr. Braun for further discussion. 5/26/06: Board members expressed concern regarding the \$60K needed to conduct the survey. Board members agreed to postpone discussion on action until next Governor takes office.
Board Action: 12/09/05 Tabled, till 2007.
- 44. Industry Center:** 8/19/05: The Board supports the new direction for boot-strapping funding for an industry center by creating an "umbrella" of research projects that members can fund and/or pursue funding joint funding from Federal agencies. The Board requests to be informed with progress in this area. 12/9/05: The school and Board members are having ongoing discussions regarding joint projects and funding opportunities. The LA Grid Program is the outcome of conversations with IBM. The school will update Board members going forward. *Board Action: 12/09/05 Closed*
- 45. Marketing:** 8/19/05: The Board requests that the school develop marketing materials to promote FIU, the school and its accomplishments. The Board suggests that this effort occur jointly with member companies with the goal of producing joint press releases. Mr. Braun offers the assistance of his staff for developing marketing and communications strategy. Mr. Braun felt that the marketing materials would be useful for recruiting new board members as well. Mr. Borrás has also offered marketing assistance. Dr. Prasad is hiring a publications/publicity staff member. Mr. Braun suggests that the three of these staff members meet to coordinate marketing efforts. The timing for this effort will depend on the resolution of the reorganization. 12/09/05: Ms. Santana offers

assistance with marketing effort. School is working on new marketing materials and will follow-up with companies reporting progress as requested.

Board Action: 12/09/05 Closed

- 46. NSF Award:** 8/19/05: Mr. Braun requests that if NSF awards the School with the BPC grant, the school should prepare joint press releases to promote the award to the community. 12/9/05: Grant was denied. Reviewer's comments were positive. School to reapply in Spring '06. School will update Board on progress.

Board Action: 12/09/05 Closed

- 47. LA Grid:** 8/19/05: The Board expresses approval of the LA Grid initiative, a partnership between IBM, FIU and other universities. The Board asks to be kept informed of the activity. 12/9/05: Pete Martinez provides Board with overview of the LA Grid Program. School will update Board on progress.

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- 49. IT Industry Scholarship Fund:** 12/9/06: The Board agreed to review a proposal by Dr. Deng to develop an industry-based funding mechanism for student scholarships to attract high quality students. Dr. Deng will develop the proposal and distribute to Board members as soon as possible. A conference call should be scheduled thereafter to discuss the proposal. 5/25/06: Board members agreed to pursue the Scholarship Fund Campaign. Mr. Luis prepared and distributed materials for Board members to discuss with their colleagues. 04/07: Tabled to obtain more Board member feedback and direction.

Board Action: 12/09/05 Open, pending review

- 50. Business Continuity Information Network:** 12/07: Mr Braun suggests to Board members to reach out to their peers and networks to facilitate support. Board interested in sending letter of support on behalf of Centers of Excellence to lobby Gov. Board. Not pursued due to lobby rule limitations.
- 51. Board Chair:** 9/12/08: Pete Martinez nominated and with a unanimous vote of the Board is elected as Board Chair. Dr. Meleis steps down as Board Vice-Chair. Mr. Martinez to nominate a Vice-Chair. 12/5/08: Dr. Roy Gerber is appointed Board Vice Chair. Closed
- 52. School Move:** 12/4/09: Mr. Gerber receives a motion from the Board to create a draft letter to circulate to the Board member for comment/signature expressing concern for moving the School to the Engineering Center building. A letter was drafted, circulated, signed and delivered to FIU Provost in Dec. 2009. Provost responded by stating that the School's future success is paramount in his decision and that the Board will be consulted before any decisions are made. *Closed.*
- 53. Student Mentoring:** 9/12/08: Mr. Martinez proposes and the Board members agree to support a Student Mentoring program whereby each Board members would become a mentor of a student of the school. Mr. Martinez asks that a list of potential student candidates be drawn up. 12/5/08: Mr. Luis provides Board with resumes of students interested in the Mentoring program via web location of Board Materials. 9/10/10: Mr. Borrás receives first student to mentor. *Ongoing*
- 54. Board Membership:** 8/19/05: The Board has identified 8 companies to pursue for Board membership. The Board has set as a goal to have 15 total members. FIU will work with Mr. Braun to further communicate (via letter/phone) with non-active board members and potential members we would ask to join. Board members are encouraged to participate in the recruitment process. 12/9/05: Nick Bowen/IBM and Armando Garcia/IBM withdraw from the Board. Pete Martinez is added. Board members agree to pursue 4 additional members. Dr. Meleis will contact Citrix. Pete Martinez will contact Telefonica. Mr. Braun has made initial contact with Global Crossing, requires follow-up. FIU will continue discussions with PBS&J. 5/26/06: Dr. Meleis invited Mr. Cristinziano, Citrix VP, who accepted invitation. Also, Board members agreed that the Board should become larger before developing sub-committees. 12/15/06: Mr. Cristinziano steps down due to relocation. 2/26/07: Conf. Call, two new Board members are introduced, Mr. Pallin and Mr. Buchenhorner, three additional members are begin sought by April Meeting. Membership stands at 12. 4/07: Board affirms that 15 members are sought by next meeting. Dr. Meleis suggested that the Board review the objectives of the Board to assist in identifying additional members to recruit. 9/07: Three new Board members are introduced, Mr. Bravo/Microsoft, Mr. Fleck/Citrix and Mr. Ugale/Crossbow Ventures. Dr. Meleis proposed that the Board finalize objectives and create committees to work on Board objectives. 12/07: Mr. Braun requests further information about the objectives of the school going forward to better align with Board committee development. Item deferred to next meeting. *Board Action: 12/9/05, closed*
- 55. Committees:** 9/12/08: Mr. Martinez proposes and the Boards passes the creation of two committees: Research and Talent Development. The Research Committee will help the school align its resources with Federal, State and local strategic investments and funding opportunities from the

private and public sector. The Talent Development Committee will assist the school to develop programs to enhance student research and education experiences, further driving the competitiveness of our students. 12/5/08: Committees to meet via conf. call to formulate goals and actions. *Closed*

56. *BS in Computer Science Program Educational Objectives and Student Outcomes*: 12/10/10: Dr. Navlakha presented the modified outcomes for the BS-CS program, and the Board unanimously concurred with the suggested modifications. The documents are available with Board materials. CLOSED
57. *CS Senior Projects*: 12/10/10 : Board members request that there be regular presentations from Senior Project students. The dialog is beneficial for both industry and school. Student presentations will be evaluated for Fall and Spring agenda based on quality and relative interest of the board. CLOSED
58. *Technology Transfer Initiative*: 9/10/10: Board members approve of the School's efforts to assist faculty and students accelerate the IP development process by improving licensing options, expediting IP review process, and providing pre-incubator technical and business support. Board members offer to provide further guidance. Mr. Luis to contact Board members with next steps. CLOSED
59. *Collaborative Open Innovation Lab*: 4/29/11: Board members express interest to participate as COIL mentors. Program is awaiting final approval. Mr. Luis to provide information to the Board regarding mentoring opportunity. 9/16/11: Waiting for final approval of program via External Programs/University College. 12/2/11. Mr. Luis updates Board members that the COIL program has started activities. CLOSED
60. *National Rankings*: 9/16/11: Board members request to know the key metrics the school is tracking for improving national ranking. 12/2/11: Dr. Iyengar discusses rankings in his presentation. The NRC ranking is not due for another three years. CLOSED
61. *Intellectual Property*: 9/16/11: Board members request to know more about intellectual property/patents efforts in the school. 12/2/11: Dr. Iyengar and Mr. Luis present information about IP at FIU. No further action is requested. CLOSED
62. 12/2/12: Board Members have requested that the School begin tracking where its graduates are finding jobs and report back on findings periodically. 4/27/12: A survey of recent graduates was presented and an Alumni listing which is posted on the website is started. Updates will continue and reports given to the Board periodically. CLOSED.
63. 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey. Employment Survey presented at 12/02/16 meeting. See materials for details.

**INDUSTRY ADVISORY BOARD
Florida International University
School of Computing and Information Sciences**

Board Meeting Actions and Summary (DRAFT)

April 18th, 2019

Florida International University

Miami, FL

Board Member Attendance:

- Pete Martinez, IAB Chair, Chairman and CEO, Game Changer Tec, LLC
- Dr. Roy Gerber, IAB Vice Chair and Chief Technology Officer, Candidate.Guru
- Juan Caraballo, Director, Global University Programs IBM Corp. (Retired)
- David Martinez, Associate Head, MIT Lincoln Lab
- Bert Sylvestre, Vice President Business Development, Pro Logic Systems

FIU Representation:

- Dr. Shu-Ching Chen, Associate Director and an Eminent Scholar Chaired Professor, FIU SCIS
- Dr. Fahad Saeed, Associate Professor, FIU SCIS
- Steven Luis, Executive Director of Technology and Industry Relations, FIU CEC

Board Meeting Summary

28. Mr. Martinez begins the meeting at 5:20 pm.
29. Mr. Martinez in his opening statements welcomes Board members. He states how valuable these meetings are to both the students and Board members. Board member provide advice to the school leadership and the students and faculty are providing Board members with information about emerging technologies. He further states how the employment market for technology students is very active and students are in a good position to find excellent job opportunities.
30. Dr. Chen presents his report to the Board (see materials.)
 - a. Dr. Chen presents recent faculty and student awards. He summarizes school metrics including enrollment, new degree offerings and employment of our students.
 - i. Mr. Caraballo comments how well Mark Finlayson has progressed as a rising star in our school.
 - ii. Mr. Dave Martinez also commends Sheila a recent graduate and now PhD student for her stellar work at the Lincoln Labs Internship.
 - b. He continues by discussing the challenges of the increased undergraduate enrollment. Suggests that the growth may be due to the CS BA degree.
 - i. Several board members comment regarding this trend and express concern how the school will be able to handle the growth in the coming academic year. Additional discussions are made regarding FIU's 4-year graduation rate objectives and the need to increase our graduation rate as well. Board members request to be kept abreast of these concerns and express their interest to discuss these issues with management as needed.
 - c. Dr. Chen discusses the modification of our BS in CS and IT degrees. Dr. Chen asks if there are any questions regarding these changes and if Board members are in agreement. The Board, through the Chair, expressed their approval of these measures.
 - d. He continues reviewing faculty research and educational activities.
 - e. He introduces the new faculty expected in Fall of 2019.
 - f. Dr. Chen shares information regarding patent awards, student placement and other industry engagement activities.
 - g. He ends his presentation by sharing a variety of student organization events, such as Hackathons, workshops and conferences – demonstrating how active our students are in their career development.
 - h. He thanks Board members for attending and for their feedback.
31. Dr. Saeed presents his research activities. (See materials)
 - a. Dr. Saeed discusses his computational science work as it relates to Big Data, Biology, and HPC.
 - b. He describes the scale of Big Data and the uses in Personal Medicine.
 - c. He further shows how his research team is developing machine learning tools to analyze a variety of health data for cancer detection, autism detection, and precision medicine.
 - d. Dr. Saeed acknowledges the work of his students and the assistance he has received from FIU, Intel, NIH, NSF and Nvidia.
 - e. Mr. Caraballo commented that this work is well suited for an NSF MRI grant. Further he felt that with some polish the work could have commercial impact.
32. Senior Project/VIP Highlight Presentations (see vip.fiu.edu)

- a. Students provide details about their projects and receive feedback from board member.
 - b. Mr. Martinez complimented the students on how well they presented their work.
 - c. Mr. Sylvestre noted that some of the Senior projects could be turned into commercial products and encouraged students to pursue that opportunity.
33. Mr. Gerber, on behalf of Mr. Martinez, asks Board members for their feedback.
- a. Mr. Sylvestre felt that the senior projects were presented were great. At this point, some projects have moved from the idea stage to hardening stage – moving from version 1 to 5, 6, 7. He pointed out how these projects give students real world experience. Not only do the projects reinforce the hard skills but it gives the students a chance to demonstrate soft skills like communications and team building. Without these experiences you will limit your career growth.
 - b. Mr. Caraballo commented how the school each year takes on a number of challenges of has been successful of addressing them. He advises the school to continue to measure yourself against other departments and to standardize these metrics over years. Use this information to make your case for resources to address the current challenges.
 - c. Mr. Dave Martinez stated he felt that the meeting was productive and effective. He understands the challenge of 4 graduation and suggests looking at how other universities are accomplishing this task. He suggests tracking students’ performance in each class to learn insights. Metrics are what will allow you to develop a strategic plan. He also pointed out that on the Dr. Saeed’s work, adding more collaborative research efforts will help the work converge and create more impact.
 - d. Dr. Gerber suggested that when the time is right to take these resource issues facing the school to the Dean. He feels also the school is in the middle of a “perfect storm” of issues and a strategic plan needs to be developed to address them.
34. Mr. Luis discusses potential dates with Board members for the next meeting. The next meeting will align with the next College-Wide Senior Design Showcase that is in early Dec. The tentative date is Friday Dec. 6th.
35. Dr. Gerber, on behalf of Mr. Martinez, thanks Board Member for their participation and closes the meeting at 7:50pm.

Summary of Board Actions

- 4. 4/29/11: Board members offer to assist school reach out to local companies to broaden participation in the school development. Terremark and Cruise Lines are suggested as the first companies to approach. School to obtain FIU Foundation approval to begin discussions with these companies. Continue development with incoming Director. 9/16/11: We have Foundation approval to open discussion with RCL. 12/2/12: Foundation has given approval to approach RCL. 4/27/12: Mr. Silvestre will reach out to RCCL for interest to participate on the Board. 9/14/12: Mr. Silvestre presented two new Board members from RCCL: Max Schmidt and Jose Machado. 12/7/13: Dr. Gerber introduces new Board member Thomas Packert, VP of Information Management, Orthosenor. 4/21/17: David Martinez MIT Lincoln Lab is introduced to the Board. Board members continue to pursue potential Board member prospects.

5. 4/18/19: Board members request to be updated on challenges of obtaining resources to address the increased enrollment of the program. They want to have more information about the resources needed and are ready to have conversations with management as needed.

Summary of Closed/Tabled Actions

- 64. FL Governor Discussion:** 8/19/05: Mr. Braun has requested Dr. Deng investigate the cost of a study to better understand IT employment attraction and retention issues in South Florida. The study will be used as a basis for a discussion with Florida's Governor, Mr. Braun, Board members and Dr. Maidique/FIU. 12/9/05: The cost for the IT employment study request by Mr. Braun is \$60K. The Board defers this item to Mr. Braun for further discussion. 5/26/06: Board members expressed concern regarding the \$60K needed to conduct the survey. Board members agreed to postpone discussion on action until next Governor takes office.
Board Action: 12/09/05 Tabled, till 2007.

- 65. Industry Center:** 8/19/05: The Board supports the new direction for boot-strapping funding for an industry center by creating an "umbrella" of research projects that members can fund and/or pursue funding joint funding from Federal agencies. The Board requests to be informed with progress in this area. 12/9/05: The school and Board members are having ongoing discussions regarding joint projects and funding opportunities. The LA Grid Program is the outcome of conversations with IBM. The school will update Board members going forward. *Board Action: 12/09/05 Closed*

- 66. Marketing:** 8/19/05: The Board requests that the school develop marketing materials to promote FIU, the school and its accomplishments. The Board suggests that this effort occur jointly with member companies with the goal of producing joint press releases. Mr. Braun offers the assistance of his staff for developing marketing and communications strategy. Mr. Braun felt that the marketing materials would be useful for recruiting new board members as well. Mr. Borrás has also offered marketing assistance. Dr. Prasad is hiring a publications/publicity staff member. Mr. Braun suggests that the three of these staff members meet to coordinate marketing efforts. The timing for this effort will depend on the resolution of the reorganization. 12/09/05: Ms. Santana offers assistance with marketing effort. School is working on new marketing materials and will follow-up with companies reporting progress as requested.
Board Action: 12/09/05 Closed

- 67. NSF Award:** 8/19/05: Mr. Braun requests that if NSF awards the School with the BPC grant, the school should prepare joint press releases to promote the award to the community. 12/9/05: Grant was denied. Reviewer's comments were positive. School to reapply in Spring '06. School will update Board on progress.

Board Action: 12/09/05 Closed

- 68. LA Grid:** 8/19/05: The Board expresses approval of the LA Grid initiative, a partnership between IBM, FIU and other universities. The Board asks to be kept informed of the activity. 12/9/05: Pete Martinez provides Board with overview of the LA Grid Program. School will update Board on progress.

Board Action: 12/09/05 Closed

- 69. Board Action Procedures:** 12/9/05: The Board discussed several procedural mechanisms to process action items with the goal of closing action items out expeditiously. These procedures are:
- a. Once attending Board members, those present at the current meeting, decide to close an item it no longer needs to be discussed.
 - b. If an action plan is put in place for a Board action item, the item should be closed. The party taking responsibility for the action plan should report to the Board periodically on the outcomes of the plan.
 - c. It is sufficient for action to be taken on any agenda item by the attending Board members.
 - d. Actions items accepted by the Board should establish a time limit with the understanding that action should be taken within that time or should be closed.
 - e. The school will implement these procedures at upcoming meetings.

Board Action: 12/09/05 Closed

- 70. IT Industry Scholarship Fund:** 12/9/06: The Board agreed to review a proposal by Dr. Deng to develop an industry-based funding mechanism for student scholarships to attract high quality students. Dr. Deng will develop the proposal and distribute to Board members as soon as possible. A conference call should be scheduled thereafter to discuss the proposal. 5/25/06: Board members agreed to pursue the Scholarship Fund Campaign. Mr. Luis prepared and distributed materials for Board members to discuss with their colleagues. 04/07: Tabled to obtain more Board member feedback and direction.

Board Action: 12/09/05 Open, pending review

- 71. Business Continuity Information Network:** 12/07: Mr Braun suggests to Board members to reach out to their peers and networks to facilitate support. Board interested in sending letter of support on behalf of Centers of Excellence to lobby Gov. Board. Not pursued due to lobby rule limitations.

- 72. Board Chair:** 9/12/08: Pete Martinez nominated and with a unanimous vote of the Board is elected as Board Chair. Dr. Meleis steps down as Board Vice-Chair. Mr. Martinez to nominate a Vice-Chair. 12/5/08: Dr. Roy Gerber is appointed Board Vice Chair. Closed

- 73. School Move:** 12/4/09: Mr. Gerber receives a motion from the Board to create a draft letter to circulate to the Board member for comment/signature expressing concern for moving the School to the Engineering Center building. A letter was drafted, circulated, signed and delivered to FIU Provost in Dec. 2009. Provost responded by stating that the School's future success is paramount in his decision and that the Board will be consulted before any decisions are made. *Closed.*
- 74. Student Mentoring:** 9/12/08: Mr. Martinez proposes and the Board members agree to support a Student Mentoring program whereby each Board members would become a mentor of a student of the school. Mr. Martinez asks that a list of potential student candidates be drawn up. 12/5/08: Mr. Luis provides Board with resumes of students interested in the Mentoring program via web location of Board Materials. 9/10/10: Mr. Borrás receives first student to mentor. *Ongoing*
- 75. Board Membership:** 8/19/05: The Board has identified 8 companies to pursue for Board membership. The Board has set as a goal to have 15 total members. FIU will work with Mr. Braun to further communicate (via letter/phone) with non-active board members and potential members we would ask to join. Board members are encouraged to participate in the recruitment process. 12/9/05: Nick Bowen/IBM and Armando Garcia/IBM withdraw from the Board. Pete Martinez is added. Board members agree to pursue 4 additional members. Dr. Meleis will contact Citrix. Pete Martinez will contact Telefonica. Mr. Braun has made initial contact with Global Crossing, requires follow-up. FIU will continue discussions with PBS&J. 5/26/06: Dr. Meleis invited Mr. Cristinziano, Citrix VP, who accepted invitation. Also, Board members agreed that the Board should become larger before developing sub-committees. 12/15/06: Mr. Cristinziano steps down due to relocation. 2/26/07: Conf. Call, two new Board members are introduced, Mr. Pallin and Mr. Buchenhorner, three additional members are begin sought by April Meeting. Membership stands at 12. 4/07: Board affirms that 15 members are sought by next meeting. Dr. Meleis suggested that the Board review the objectives of the Board to assist in identifying additional members to recruit. 9/07: Three new Board members are introduced, Mr. Bravo/Microsoft, Mr. Fleck/Citrix and Mr. Ugale/Crossbow Ventures. Dr. Meleis proposed that the Board finalize objectives and create committees to work on Board objectives. 12/07: Mr. Braun requests further information about the objectives of the school going forward to better align with Board committee development. Item deferred to next meeting. *Board Action: 12/9/05, closed*
- 76. Committees:** 9/12/08: Mr. Martinez proposes and the Boards passes the creation of two committees: Research and Talent Development. The Research Committee will help the school align its resources with Federal, State and local strategic investments and funding opportunities from the private and public sector. The Talent Development Committee will assist the school to develop programs to enhance student research and education experiences, further driving the competitiveness of our students. 12/5/08: Committees to meet via conf. call to formulate goals and actions. *Closed*
- 77. BS in Computer Science Program Educational Objectives and Student Outcomes:** 12/10/10: Dr. Navlakha presented the modified outcomes for the BS-CS program, and the Board unanimously concurred with the suggested modifications. The documents are available with Board materials. **CLOSED**
- 78. CS Senior Projects:** 12/10/10 : Board members request that there be regular presentations from Senior Project students. The dialog is beneficial for both industry and school. Student presentations

will be evaluated for Fall and Spring agenda based on quality and relative interest of the board.
CLOSED

- 79. *Technology Transfer Initiative:*** 9/10/10: Board members approve of the School's efforts to assist faculty and students accelerate the IP development process by improving licensing options, expediting IP review process, and providing pre-incubator technical and business support. Board members offer to provide further guidance. Mr. Luis to contact Board members with next steps.
CLOSED
- 80. *Collaborative Open Innovation Lab:*** 4/29/11: Board members express interest to participate as COIL mentors. Program is awaiting final approval. Mr. Luis to provide information to the Board regarding mentoring opportunity. 9/16/11: Waiting for final approval of program via External Programs/University College. 12/2/11. Mr. Luis updates Board members that the COIL program has started activities. CLOSED
- 81. *National Rankings:*** 9/16/11: Board members request to know the key metrics the school is tracking for improving national ranking. 12/2/11: Dr. Iyengar discusses rankings in his presentation. The NRC ranking is not due for another three years. CLOSED
- 82. *Intellectual Property:*** 9/16/11: Board members request to know more about intellectual property/patents efforts in the school. 12/2/11: Dr. Iyengar and Mr. Luis present information about IP at FIU. No further action is requested. CLOSED
- 83.** 12/2/12: Board Members have requested that the School begin tracking where its graduates are finding jobs and report back on findings periodically. 4/27/12: A survey of recent graduates was presented and an Alumni listing which is posted on the website is started. Updates will continue and reports given to the Board periodically. CLOSED.
- 84.** 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey. Employment Survey presented at 12/02/16 meeting. See materials for details.

APPENDIX J: Examples of Learning Outcomes

CDA 3103 Fundamentals of Computer Systems

Course Outcomes:

1. Master the representations of numeric and character data
2. Master the implementation of some basic combinational circuits, registers and memories
3. Be familiar with the data path of a simple von Neumann architecture and its relation to the instruction execution cycle
4. Master simple machine and assembly language programming
5. Master the implementation of high-level language constructs in lower levels: selection, iteration, function call/return

Learning Outcomes:

- 1.1 Derive and interpret the two's-complement representation of signed integers
- 1.2 Derive and interpret at least one representation of real numbers, e.g. IEEE Short Real
- 1.3 Interpret the representation of character data in some standard format, e.g. ASCII

- 2.1 Demonstrate the effect of NOT, AND, OR and XOR operations on binary data
- 2.2 Analyze a simple circuit using fundamental building blocks
- 2.2 Characterize the operation of the decoder, multiplexer, adder and simple memory circuits

- 3.1 Describe the organization and components of a simple von Neumann architecture
- 3.2 Demonstrate the implementation of simple machine language instructions using register transfer notation

- 4.1 Write programs in machine and assembly language employing flow-of-control and subroutine call and return constructions
- 4.2 Describe the operation of a simple 2-pass assembler

- 5.1 Demonstrate how conditional operations and transfer of control are implemented at the machine level
- 5.2 Demonstrate how parameters are passed to subroutines and how local workspace is created and accessed at the assembly language level

COP 4710 Database Management

Course Outcomes

1. Be exposed to information systems
2. Be familiar with database system and database architecture
3. Master the design conceptual schemas
4. Master normalization theory and the mapping of a conceptual schema to a relational schema
5. Master the expression of queries in SQL, relational algebra, and relational calculus
6. Be familiar with physical database design
7. Be familiar with writing application programs that use SQL

Learning Outcomes

- 1.1 Explain basic information storage and retrieval concepts
- 1.2 Describe issues of information privacy, integrity, security and preservation

- 2.1 Describe the goals, components and functions of a database system
- 2.1 Explain the concept of data independence and its importance in a database system

- 3.1 Characterize the various data models
- 3.2 Design the conceptual schema for a database

- 4.1 Prepare a relational schema from a conceptual model

- 5.1 Demonstrate queries in relational algebra using union, intersection, difference, and Cartesian product operations
- 5.2 Demonstrate queries in tuple relational calculus, domain relational calculus, and SQL

- 6.1 Evaluate functional dependencies between two or more attributes in a relation

- 7.1 Describe database queries (insert, update, retrieve, and delete) using SQL statements