

## APPENDICES

- A.** A-1: BS in CS *Program Educational Objectives*  
A-2: BS in CS *Student Outcomes*  
A-3: BS in CS *Program Educational Objectives* – Modified in Spring 2015  
A-4: BS in CS *Student Outcomes* – Modified in Spring 2015
  
- B.** B-1: The SCIS BS in CS *Assessment Plan*  
B-2: The SCIS BS in CS *Assessment Mechanisms & Procedures*
  
- C.** Subject Area Coordinator Reports
  
- D.** D-1: Exit (Graduating Student) Survey and Semester-wise Data  
D-2: Exit Survey Summary for the Assessment Period
  
- E.** E-1: Alumni Survey Data and Results  
E-2: Employer Survey Instrument  
E-3: Employer Survey Data and Results
  
- F.** Course Embedded Assessment Summaries (Fall 2013, Spring 2014, and Summer 2014)
  
- G.** G-1: *Senior Project Assessment of Student Outcomes of the BS in Computer Science* rubric, check-list and score-grid.  
G-2: Senior Project Evaluation – Summer 2013  
G-3: Senior Project Evaluation – Fall 2013  
G-4: Senior Project Evaluation – Spring 2014  
G-5: Senior Project Evaluation – Summer 2014  
G-6: Senior Project Evaluation – Fall 2014  
G-7: Senior Project Evaluation – Spring 2015  
G-8: Senior Project Evaluation Summary for the Assessment Period
  
- H.** Student Organization reports (ACM, UPE, WICS, STARS, Linux Users Group, Programming Team)
  
- I.** Minutes of SCIS Industrial Advisory Board (IAB) Meetings
  
- J.** Examples of Learning Outcomes

## **APPENDIX A-1: BS in CS *Program Educational Objectives***

<http://www.cis.fiu.edu/programs/undergrad/csassessment/bsoutcomes.php>

### ***BS Computer Science Program Educational Objectives***

1. To provide our graduates with a broad-based education that will form the basis for personal growth and life-long learning.
2. To provide our graduates with a quality technical education that will equip them for productive careers in the field of Computer Science.
3. To provide our graduates with the communication skills and social and ethical awareness requisite for the effective and responsible practice of their professions.
4. To prepare students for BS level careers or continued graduate education.

## **APPENDIX A-2: BS in CS *Student Outcomes***

<http://www.cis.fiu.edu/programs/undergrad/csassessment/bsoutcomes.php>

### ***BS-CS Student Outcomes***

To complete the program of study for the BS in Computer Science, every student will

- a) Demonstrate proficiency in the foundation areas of Computer Science including discrete structures, logic and the theory of algorithms.
- b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.
- c) Demonstrate proficiency in problem solving and application of software engineering techniques.
- d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.
- e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.
- f) Demonstrate the ability to work cooperatively in teams.
- g) Demonstrate effective communication skills.
- h) Have experience with contemporary environments and tools necessary for the practice of computing

**APPENDIX A-3: BS in CS *Program Educational Objectives* – Modified in Spring 2015**

<http://www.cis.fiu.edu/programs/undergrad/csassessment/bsoutcomes.php> (Needs to be modified)

***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-4: BS in CS *Student Outcomes* – Modified in Spring 2015

<http://www.cis.fiu.edu/programs/undergrad/csassessment/bsoutcomes.php> (Needs to be modified)

### ***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. Each SAC bears responsibility for a group of courses in the BS in Computer Science curriculum:

**Foundations** Subject Area courses:

MAD 2104, MAD 3512, COP 4534, COP 4555, COT 3420

List 2 electives: MAD 3305, MAD 3401, MAD 4203, MHF 4302

**Programming** Subject Area courses:

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

**Software Engineering** Subject Area courses:

CEN 4010, CEN 4021, CEN 4072, CIS 4911

**Computer Organization** Subject Area courses:

CDA 3103, CDA 4101, CNT 4713, COP 4610

**Computer Systems** Subject Area courses:

CAP 4453, CAP 4770, COP 4604, CEN 4083, COP 4710, COP 4722

**Professional Development** Subject Area courses:

CGS 1920, CGS 3095, ENC 3249

**Calculus and Physics** Area courses:

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**

## **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**

## Computer Organization: Area Coordinator Report

Nagarajan Prabakar

October 29, 2015

### 1. Introduction:

The Computer Organization area consists of the following four courses: CDA-3103 (Fundamentals of Computer Systems), CDA-4101 (Structured Computer Organization), CNT-4713 (Net-Centric Computing), and COP-4610 (Operating Systems Principles). The assessment report given below for each of these courses is based on student responses about the course outcomes and the faculty course appraisals.

### 2. 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>Professor</u>
Summer 2013	18	4.85	4.85	Pestaina
Fall 2013	59	4.56	4.49	Pestaina
Spring 2014	90	4.41	4.10	Pestaina
Summer 2014	25	4.65	4.60	Pestaina
Fall 2014	71	4.46	4.41	Pestaina
Spring 2015	76	4.29	4.36	Pestaina
	=====	=====	=====	
Total	339	4.46	4.37	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 in the Students Suggestions section.

**Recommendation:** From instructor course appraisals, students seem to be deficient in algorithmic process, basic logic and programming skills. These deficiencies need to be addressed in introductory CS courses.

### 3. 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>Professor</u>
Summer 2013	11	4.30	3.88	Prabakar
Fall 2013	25	4.28	3.81	Prabakar
Spring 2014	47	4.33	3.75	Prabakar
Summer 2014	3	5.00	5.00	Prabakar
Fall 2014	44	4.46	4.41	Downey & Prabakar

Spring 2015	52	4.60	4.61	Downey
	=====	=====	=====	
Total	182	4.44	4.19	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:** From instructor course appraisals, additional course outcomes need to be added on hardware (familiarity on I/O devices).

#### 4. **CNT-4713: Net-Centric Computing**

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

	<u>No. of Student</u>	<u>Value of</u>	<u>Coverage</u>	
	<u>Responses</u>	<u>Outcome</u>	<u>Adequacy</u>	<u>Professor</u>
Fall 2013	7	4.69	4.55	Liu
Spring 2014	16	4.67	4.36	Martinez
Summer 2014	17	4.69	4.54	Martinez
Fall 2014	22	4.42	4.07	Liu
Spring 2015	16	4.70	4.40	Deng & Xin
	=====	=====	=====	
Total	78	4.61	4.34	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.

#### 5. **COP-4610: Operating Systems Principles**

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

	<u>No. of Student</u>	<u>Value of</u>	<u>Coverage</u>	
	<u>Responses</u>	<u>Outcome</u>	<u>Adequacy</u>	<u>Professor</u>
Summer 2013	11	4.61	4.59	Osorio
Fall 2013	18	4.80	4.81	Wei
Spring 2014	24	4.63	4.10	Zhao
Summer 2014	20	4.48	4.35	Osorio
Fall 2014	5	5.00	4.48	Wei
Spring 2015	10	4.42	4.26	Prabakar
	=====	=====	=====	
Total	88	4.63	4.40	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.

# Computer Programming Subject Area Report

*Prepared by Norman Pestaina, Subject Area Coordinator*

*October 28, 2015*

## Table of Contents

Overview .....	22
COP 2210 Computer Programming I .....	24
COP 3337 Computer Programming II .....	28
COP 3530 Data Structures .....	31
COP 4226 Advanced Windows Programming .....	39
COP 4520 Introduction to Parallel Programming .....	41
Summary of Recommendations .....	44

## Overview

This report covers the period from Summer 2013 through Spring 2015. It summarizes and analyzes data from the SCIS Course Evaluation System (CES) and Instructor Course Appraisal (ICA) surveys for required and elective BS-CS courses in the Computer Programming subject area:

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

The CES survey is administered, towards the end of each semester, to students registered in all sections of these courses. The ICA survey is completed soon after the end of the semester by each instructor.

SEMESTER	COP 2210		COP 3337		COP 3530		COP 4338		COP 4226		COP 4520	
	CES	ICA	CES	ICA	CES	ICA	CES	ICA	CES	ICA	CES	ICA
<i>Summer '13</i>	x	x	x		x		x	x				
<i>Fall '13</i>	x	x	x	x	x	x	x	x	x	x		
<i>Spring '14</i>	x	x	x	x	x	x	x	x			x	x
<i>Summer '14</i>		x	x	x	x	x	x	x				
<i>Fall '14</i>	x	x	x	x	x	x	x		x	x		
<i>Spring 15</i>	x	x	x	x	x	x	x	x			x	x

**Table 1: Availability of CES and ICA Course Data, Summer 2013 – Spring 2015**

The Course Evaluation System (CES) administers a multi-part survey. Student responses are anonymous.

1. In the CES Survey of Course Delivery, students provide ratings on a scale of 1 through 5 on each of:
  - *My preparation for taking this course*
  - *The level of difficulty of this course*
  - *The suitability of the textbook for this course*
  - *The amount of homework required for this course*
2. In the CES Survey of Course Outcomes, students provide ratings on a scale of 1 through 5 on:
  - *The value of the outcome*
  - *The adequacy of class coverage of the outcome*
3. A separate CES Overall Rating of Course Outcomes is solicited, also on a scale of 1 through 5.
4. Students may also offer written suggestions on any aspect of the course.

The Instructor Course Appraisal (ICA) survey solicits an instructor's appraisals of the relevance and coverage of the Course Outcomes, and student preparation for taking a course.

1. Instructors indicate coverage of course outcomes by completing a grid mapping course activities (assignments, tests, etc.) to course outcomes.
2. Instructors separately rate the Appropriateness and extent of Coverage of each Course Outcome
  - Relevance: *Essential, Very Appropriate, Appropriate, Inappropriate*
  - Coverage: *Extensively, Adequately, Not Enough, Not At All*
3. Instructors separately rate the Relevance and students' Mastery of each Prerequisite Outcome documented in the course syllabus:
  - Relevance: *Highly Useful, Useful, Incidental, Irrelevant*
  - Mastery: *Good, Adequate, Deficient, Non-existent*
4. The instructor's Prerequisite Outcomes Suggestions are solicited
5. Instructors may offer General Comments about the course

## COP 2210 Computer Programming I

This is a **required** course in the BS-CS curriculum. It is offered in every semester.

### A. Course Delivery

COP 2210		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Amount of Homework
<i>SU '13</i>	26	4.50	4.46	4.15	4.62
<i>FA '13</i>	1	5.00	5.00	5.00	5.00
<i>SP '14</i>	69	3.86	4.12	3.94	4.55
<i>SU '14</i>					
<i>FA '14</i>	57	3.75	4.21	3.93	4.37
<i>SP '15</i>	73	4.10	4.10	4.11	4.38
<b>ALL</b>	<b>226</b>	<b>3.99</b>	<b>4.18</b>	<b>4.02</b>	<b>4.46</b>

**Table 2210-1: Survey of COP 2210 Course Delivery**

### Analysis (Delivery)

- 1) All aspects of COP 2210 course delivery are rated at or above the 75% level (3.75/5) in each semester for which CES data is available.
- 2) It must be noted that in every semester, and overall, students' rating of their preparation for COP 2210 ranks lowest among the items surveyed.

### B. Course Outcomes

- O1. Be familiar with the concepts of Objects & Classes
- O2. Master the fundamental Java data types
- O3. Master the Java selection and iteration constructs
- O4. Master using String, ArrayList and Wrapper classes
- O5. Master analyzing problems and writing Java program solutions to those problems using the above features

COP 2210		CES Value and Coverage of Course Outcomes									
Term	#	O1		O2		O3		O4		O5	
		Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
<i>SU 13</i>											
<i>FA 13</i>	1	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
<i>SP 14</i>	69	4.81	4.66	4.67	4.57	4.59	4.52	4.40	4.32	4.72	4.45
<i>SU 14</i>											
<i>FA 14</i>	57	4.65	4.50	4.59	4.55	4.51	4.44	4.51	4.29	4.60	4.30
<i>SP 15</i>	73	4.71	4.57	4.68	4.56	4.71	4.46	4.51	4.27	4.63	4.42
<b>ALL</b>	<b>200</b>	<b>4.73</b>	<b>4.58</b>	<b>4.65</b>	<b>4.56</b>	<b>4.61</b>	<b>4.48</b>	<b>4.47</b>	<b>4.30</b>	<b>4.65</b>	<b>4.40</b>

**Table 2210-2: Value and Coverage of COP 2210 Individual Course Outcomes**



COP 2210 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
<i>SU 13</i>			
<i>FA 13</i>	1	5.00	5.00
<i>SP 14</i>	69	4.81	4.66
<i>SU 14</i>			
<i>FA 14</i>	57	4.57	4.42
<i>SP 15</i>	73	4.65	4.46
<b>ALL</b>	<b>200</b>	<b>4.68</b>	<b>4.52</b>

**Table 2210-3: Overall Value and Coverage of COP 2210 Course Outcomes**

ICA Appropriateness and Coverage of Course Outcomes					
COP 2210	O1	O2	O3	O4	O5
<i>Appropriateness</i>	Essential	Essential	Essential	Essential	Essential
<i>Coverage</i>	Extensive	Extensive	Extensive	Extensive	Adequate

**Table 2210-4: Instructor Appraisal of COP 2210 Course Outcomes**

### Analysis (Outcomes)

- 1) The value of each individual Course Outcome (**Table 2210-2**) is rated by students at 88% (4.4/5) or higher. The overall value rating (**Table 2210-3**) is above 93% (4.68/5). The CES students' ratings are consistent with the **Table 2210-4** overall ICA ratings of *Essential* for all Course Outcomes.
- 2) The coverage of each individual Course Outcome (**Table 2210-2**) is rated by students at 85% (4.27/5) or higher. The overall coverage rating (**Table 2210-3**) is above 90% (4.52/5). The CES student ratings are consistent with the **Table 2210-4** individual ICA ratings of *Extensive* or *Adequate* for all COP 2210 Course Outcomes.
- 3) The difference between the weighted averages of CES value and coverage ratings (**Table 2210-2**) is 0.25 (4.65 – 4.40) for outcome O5 (Problem Solving), the highest for any COP 2210 Course Outcome.
- 4) It is remarked that the ICA coverage rating of Outcome 5 (Problem Solving), although *Adequate*, is uniquely the lowest rating awarded to any COP 2210 aspect of the ICA survey.

### C. Prerequisites and Student Preparedness

There are no prerequisites for COP 2210.

### Analysis (Prerequisites)

- 1) Student Preparedness has been rated as *Deficient* in three ICA Semester summaries: Fall '13 (Shaw), Spring '14 (Milani), Spring '15 (Milani).

The Instructors' suggestions from the ICA semester summaries support these ratings:

- (Shaw) *Many students are uncomfortable with such basic arithmetic concepts as fractions, decimals, and percentages. It would be nice if students had to pass College Algebra (or equivalent) with at least a C (or even a B) before taking this class.*

- (Milani) *Students lack general motivation to put adequate time in their studies. Perhaps this can be addressed by a concerted departmental effort to increase awareness of time requirements for Computer Science courses.*

2) Students completing COP 2210 rate their preparedness for taking COP 2210 in the CES Survey of Course Delivery (**Table 2210-1**). It should be considered that the CES survey populations excludes those students who have dropped or withdrawn earlier in the semester. The Delivery Analysis bullet 2) is relevant here. Some relevant students' comments from the CES summaries are included here:

- (#15, Fall '14) *15) Sure as hell was not prepared in the least bit for this course*
- (#29, Spring '14) *I'm minoring in computer science with no programming experience, I would have preferred to be in programming 1 class that took that into consideration.*
- (#33, Spring '14) *Have a more in depth classes before this course*
- (#25, Spring '15) *I think there should be a a course before this one that it will allow you to develop the logic needed to program*

#### D. Student Suggestions

See immediately above.

There are numerous other comments relating to all aspects of COP 2210. These are available from the CES semester summaries.

#### E. Instructor Recommendations

See Section C above

#### F. SAC Recommendations

A not insignificant number of students enrolling in COP 2210 find themselves unprepared, or lack the specific aptitude needed for success. This observation is clearly supported by Analysis (Delivery) bullet 2 and Analysis (Prerequisites) bullets 1 and 2. While the BS-CS program should broaden its appeal, it also must enable students to evaluate their potential for success very early in their programs.

**Recommendation SAC2210-1:** SCIS should provide a pre-programming course focused on problem-solving and logic skills, and that introduces the algorithmic process, abstraction and some computer programming using a minimal-syntax non-production programming language and IDE. Such a course must have clearly defined learning outcomes and evaluation methodologies.

**Recommendation SAC2210-2:** SCIS should require all students enrolled in COP 2210 to complete an evaluation no later than the first week of class, and preferably earlier, in order to recommend to the student whether to continue their COP 2210 registration, or in the pre-programming course instead.

COP 2210 is taught using Java. The richness and relative complexity of the language may easily seduce instructors into focusing on the *language* rather than on *problem solving* and the *algorithmic process*. This is evidenced in Analysis (Outcomes) bullets 3 and 4.

Instruction must be re-focused on instilling those abilities that enable student success throughout the BS-CS curriculum.

**Recommendation SAC2210-3:** The COP 2210 common syllabus should be redesigned around carefully constructed learning outcomes that direct the focus of students and instructors towards abstraction, problem solving and the algorithmic process.

**Recommendation SAC2210-4:** SCIS should rethink the objectives and delivery mode of COP 2210 to reflect the role of this class as the introduction to the study and practice of Computer Science.

## COP 3337 Computer Programming II

This is a **required** course in the BS-CS curriculum. It is offered in every semester.

### A. Course Delivery

COP 3337		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Appropriate Homework
<i>SU '13</i>	16	4.69	4.75	4.31	4.88
<i>FA '13</i>	90	4.39	4.12	3.87	4.36
<i>SP '14</i>	86	4.63	4.53	4.16	4.72
<i>SU '14</i>	14	4.64	3.93	4.21	4.14
<i>FA '14</i>	122	4.47	4.31	4.16	4.43
<i>SP '15</i>	77	4.34	4.27	3.87	4.34
<b>ALL</b>	<b>405</b>	<b>4.48</b>	<b>4.31</b>	<b>4.05</b>	<b>4.47</b>

**Table 3337-1: Survey of COP 3337 Course Delivery**

### Analysis (Delivery)

All aspects of COP 3337 course delivery are rated at or above the 75% level (3.75/5).

### B. Course Outcomes

- O1. Master the design and implementation of classes using inheritance and polymorphism
- O2. Master the use and implementation of interfaces
- O3. Be exposed to writing recursive methods
- O4. Be familiar with the implementation of linked list data structures
- O5. Be familiar with the Stack & Queue data structures
- O6. Be exposed to the Java Collection interface
- O7. Master analyzing problems and writing Java program solutions to those problems

COP 3337		CES Value and Coverage of Course Outcomes													
Term	#	O1		O2		O3		O4		O5		O6		O7	
		Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
<i>SU 13</i>	16	4.94	4.73	4.93	4.87	4.75	4.20	4.88	4.63	5.00	4.94	4.88	4.75	4.75	4.07
<i>FA 13</i>	90	4.64	4.22	4.52	4.30	4.53	4.08	4.66	4.13	4.50	3.94	4.34	3.84	4.33	3.84
<i>SP 14</i>	86	4.74	4.74	4.71	4.67	4.69	4.56	4.77	4.54	4.65	4.55	4.59	4.48	4.53	4.35
<i>SU 14</i>	14	4.64	4.79	4.57	4.43	4.43	4.36	4.50	4.21	4.43	4.43	4.07	4.32	4.14	3.71
<i>FA 14</i>	122	4.70	4.56	4.57	4.52	4.52	4.36	4.66	4.52	4.47	4.32	4.48	4.18	4.47	4.17
<i>SP 15</i>	77	4.60	4.47	4.51	4.28	4.45	4.14	4.58	4.36	4.42	4.32	4.45	4.19	4.32	4.05
<b>ALL</b>	<b>405</b>	<b>4.68</b>	<b>4.52</b>	<b>4.59</b>	<b>4.47</b>	<b>4.55</b>	<b>4.29</b>	<b>4.64</b>	<b>4.36</b>	<b>4.49</b>	<b>4.29</b>	<b>4.47</b>	<b>4.20</b>	<b>4.42</b>	<b>4.09</b>

**Table 3337-2: CES Value and Coverage of COP 3337 Individual Course Outcomes**

COP 3337 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
SU 13	16	4.87	4.6
FA 13	90	4.50	4.05
SP 14	86	4.67	4.57
SU 14	14	4.40	4.23
FA 14	122	4.55	4.37
SP 15	77	4.48	4.26
ALL	405	4.56	4.32

**Table 3337-3: CES Overall Value and Coverage of COP 3337 Course Outcomes**

ICA Appropriateness and Coverage of Course Outcomes							
COP 3337	O1	O2	O3	O4	O5	O6	O7
<i>Appropriateness</i>	Essential	Essential	Essential	Essential	Very App.	Very App.	Essential
<i>Coverage</i>	Extensive	Extensive	Extensive	Extensive	Extensive	Adequate	Extensive

**Table 3337-4: Instructor Appraisal of COP 3337 Course Outcomes**

Analysis (Outcomes)

- 1) The value of each individual Course Outcome (**Table 3337-2**) is rated by students at 81% (4.07/5) or higher. The overall value rating (**Table 3337-3**) is above 91% (4.56/5). The CES students' ratings are consistent with the **Table 3337-4** overall ICA ratings of *Essential* or *Very Appropriate* for all Course Outcomes.
- 2) With one exception (SU '14, O7), the coverage of each individual Course Outcome (**Table 3337-2**) is rated by students above the 75% (3.75) level. The overall coverage rating (**Table 3337-3**) is above 86% (4.32/5). The CES student ratings are consistent with the **Table 3337-4** individual ICA ratings of *Extensive* for all but one Course Outcome that is rated as *Adequate*.
- 3) The weighted average of CES coverage ratings (**Table 3337-2**) of Outcome 7 (Problem Solving) is 4.09, the lowest for any COP 3337 Course Outcome.
- 4) The difference between the weighted averages of CES value and coverage ratings (**Table 3337-2**) is 0.33 (4.42 – 4.09) for outcome O5 (Problem Solving), the highest for any COP 3337 Course Outcome

**C. Prerequisites and Student Preparedness**

- PO1. Be familiar with Objects & Classes
- PO2. Be familiar with methods, method parameters, and parameter passing
- PO3. Master fundamental Java data types
- PO4. Master selection and iteration control structures
- PO5. Be familiar with using String, ArrayList, and Wrapper classes

		Preq O1	Preq O2	Preq O3	Preq O4	Preq O5	General
COP 3337		Obj & Classes	Methods	Fund. Types	Control Struct'	Array & String	Preparation
<i>SU 13</i>							
<i>FA 13</i>	Pelin	Deficient	Deficient	Adequate	Adequate	Deficient	Deficient
<i>FA 13</i>	Shaw	Adequate	Adequate	Good	Adequate	Good	Adequate
<i>FA 13</i>	McD Well	Good	Good	Good	Good	Good	Good
<i>SP 14</i>	Smith	Good	Good	Good	Good	Good	Adequate
<i>SP 14</i>	Shaw	Adequate	Adequate	Good	Good	Good	Adequate
<i>SU 14</i>	Pestaina	Deficient	Deficient	Adequate	Adequate	Deficient	Deficient
<i>FL 14</i>	Smith	Adequate	Good	Adequate	Good	Good	Adequate
<i>FL 14</i>	Charters	Adequate	Good	Good	Good	Good	Adequate
<i>FL 14</i>	Shaw	Adequate	Adequate	Good	Adequate	Good	Adequate
<i>SP 15</i>	Smith	Good	Good	Good	Good	Adequate	Adequate
<i>SP 15</i>	Shaw	Adequate	Adequate	Good	Good	Good	Adequate
<i>SP 15</i>	Pelin	Deficient	Deficient	Good	Good	Deficient	Deficient
<i>SP 15</i>	Navlakha	Adequate	Good	Good	Good	Adequate	Adequate

**Table 3337-5: Instructor Appraisal of Student Prerequisite Mastery & General Preparation**

**Analysis (Prerequisites)**

- 1) All COP 3337 prerequisite outcomes were rated as either *Useful* or *Highly Useful* by all instructors.
- 2) Students rate their preparation for COP 3337 as a quite high (89%, 4.48/5), (**Table 3337-1**). However, two instructors found students preparation *Deficient* in all prerequisite outcomes except Fundamental Data Types and Control Structures (**Table 3337-5**).

The following comments relating to student preparedness were offered by one instructor:

- (SU '14, Pestaina) *Students ought to be familiar with the algorithmic process and problem solving in general*
- (SU '14, Pestaina) *A significant number of students are quite unprepared. Many appear incapable of designing solutions and are plainly deficient even in understanding how to use basic control structures.*

The following suggestions by students are relevant:

- (SP '14) *Could have more concepts from programming 1 covered during it. We spent a few days going over ideas that should have been taught in that class, such as arrays.*
- (SP '15) *I think programming 1 should of prepared me more for this course. It was expected by the professor that we knew arrays but I was only taught array lists in programming 1*
- (SU '13) *Programming one needs to focus more problem solving which requires use of programming concepts more profoundly whereas instead it focuses more on syntax which requires very superficial knowledge on programming concepts.*
- (SU '14) *The difficulty curve from programming 1 and programming 2 was amazingly big. I would suggest making programming 1 be a little similar to how programming 2 would be in terms of assignments and tests.*

#### D. Student Suggestions

See immediately above.

There are numerous other comments relating to all aspects of COP 3337. These are available from the CES semester summaries.

#### E. Instructor Recommendations

See Section C above.

#### F. SAC Recommendations

COP 3337 continues the introduction to computer programming begun in COP 2210, and also introduces the study of data structures. It must share some attributes of both COP 2210 and COP 3530. Analysis (Outcomes) bullets 3 and 4 point to similar weaknesses as in COP 2210.

**Recommendation SAC3337-1:** The COP 3337 common syllabus should be redesigned around carefully constructed learning outcomes that direct the focus of students and instructors towards abstraction, problem solving and the algorithmic process.

If it is to be successful, the BS-CS program simply cannot afford a divergence of expectations between instructors in COP 2210, COP 3337 and COP 3530. Nor can it afford for students' transitions into the following course to be traumatic, as is documented in Analysis (Prerequisites).

**Recommendation SAC3337-2:** The operational syllabi of COP 2210 and COP 3337 must be integrated to ensure a seamless transition from COP 2210 into COP 3337 for both students and instructors. This can be facilitated by various means including

1. Clear articulation of learning outcomes for both COP 2210 and COP 3337.
2. Clear articulation of expected programming experiences for students in both classes, including critical feedback on students' programming style and methodology:
3. Common exams for all sections of COP 2210 designed to test achievement of the learning outcomes. These need not be a complete final exam, but could be, for example, a ½ hour multiple-choice quiz. This must contribute towards the student's class grade, either as part of a final exam, or as a stand-alone activity.
4. Scheduled meeting(s) of instructors of both classes at least once towards the end of each semester.

## ***COP 3530 Data Structures***

This is a **required** course in the BS-CS curriculum. It is offered in every semester.

#### A. Course Delivery

COP 3530		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Appropriate Homework
<i>SU '13</i>	2	5.00	5.00	5.00	5.00
<i>FA '13</i>	40	4.28	3.78	4.07	4.30
<i>SP '14</i>	44	3.98	4.02	3.73	4.56
<i>SU '14</i>	31	4.32	4.33	4.55	4.71
<i>FA '14</i>	53	4.55	4.25	3.98	4.43
<i>SP '15</i>	34	4.47	4.00	3.97	4.62
<b>ALL</b>	<b>204</b>	<b>4.33</b>	<b>4.09</b>	<b>4.04</b>	<b>4.51</b>

**Table 3530-1: Survey of COP 3530 Course Delivery**

### Analysis (Delivery)

With the exception of *Suitable Textbook* in *SP '14*, all aspects of COP 3337 course delivery are rated at or above the 75% level (3.75/5) in each semester.

### B. Course Outcomes

- O1. Be familiar with basic techniques of algorithm analysis
- O2. Be familiar with writing recursive methods
- O3. Master the implementation of linked data structures such as linked lists and binary trees
- O4. Be familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure
- O5. Be familiar with several sub-quadratic sorting algorithms including quicksort, mergesort and heapsort
- O6. Be familiar with some graph algorithms such as shortest path and minimum spanning tree
- O7. Master the standard data structure library of a major programming language (e.g. java.util in Java 5)

COP 3530		CES Value and Coverage of Course Outcomes													
Term	#	O1		O2		O3		O4		O5		O6		O7	
		Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
<i>SU 13</i>	2	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
<i>FA 13</i>	40	4.38	3.97	4.28	3.70	4.10	4.21	4.45	4.12	4.47	4.20	4.62	4.18	4.41	3.97
<i>SP 14</i>	44	4.64	3.90	4.27	3.45	4.77	4.19	4.68	4.42	4.55	3.55	4.66	3.91	4.68	3.75
<i>SU 14</i>	31	4.74	4.84	4.77	4.57	4.77	4.80	4.81	4.87	4.77	4.50	4.30	3.62	4.68	4.50
<i>FA 14</i>	53	4.77	4.60	4.42	3.66	4.60	4.15	4.75	4.81	4.74	4.26	4.47	3.74	4.50	4.04
<i>SP 15</i>	34	4.88	4.62	4.44	3.94	4.74	4.45	4.85	4.59	4.79	4.59	4.76	4.55	4.71	3.97
<b>ALL</b>	<b>204</b>	<b>4.68</b>	<b>4.37</b>	<b>4.42</b>	<b>3.82</b>	<b>4.59</b>	<b>4.33</b>	<b>4.70</b>	<b>4.56</b>	<b>4.66</b>	<b>4.19</b>	<b>4.57</b>	<b>3.99</b>	<b>4.59</b>	<b>4.03</b>

**Table 3530-2: Value and Coverage of COP 3530 individual Course Outcomes**

COP 3530 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
<i>SU 13</i>	2	5.00	5.00
<i>FA 13</i>	40	4.39	4.05
<i>SP 14</i>	44	4.61	3.88
<i>SU 14</i>	31	4.69	4.53
<i>FA 14</i>	53	4.61	4.28
<i>SP 15</i>	34	4.74	4.39
<b>ALL</b>	<b>204</b>	<b>4.60</b>	<b>4.21</b>



**Table 3530-3: CES Overall Value and Coverage of COP 3530 Course Outcomes**

COP 3530		O1	O2	O3	O4	O5	O6	O7
COP 3530		Alg. Anal.	Recursion	Lists & Trees	Advanced DS	Sub-2 Sorting	Graph Algs.	Library
SU 13								
FA 13	Pelin	Essential	Essential	Essential	Appropriate	Essential	Appropriate	Essential
FA 13	Navlakha	Essential	Essential	Essential	Essential	Essential	Essential	Essential
SP 14	Irvine	Essential	Essential	Essential	Essential	Essential	Essential	Essential
SP 14	Pelin	Essential	Essential	Essential	Essential	Appropriate	Appropriate	Essential
SU 14	Weiss	Essential	Essential	Essential	Essential	Essential	Appropriate	Essential
FL 14	Bajuelos	Essential	Essential	Essential	Essential	Essential	Essential	Essential
SP 15	Navlakha	Essential	Essential	Essential	Essential	Essential	Essential	Essential
SP 15	Pelin	Essential	Essential	Essential	Appropriate	Appropriate	Appropriate	Appropriate
SP 15	Bajuelos	Appropriate	Essential	Appropriate	Appropriate	Appropriate	Appropriate	Essential

**Table 3530-4: ISA - Instructor Appraisal of Value of COP 3530 Course Outcomes**

COP 3530		O1	O2	O3	O4	O5	O6	O7
COP 3530		Alg. Anal.	Recursion	Lists & Trees	Advanced DS	Sub-2 Sorting	Graph Algs.	Library
SU 13								
FA 13	Pelin	Adequate	Extensive	Extensive	Not Enough	Extensive	Not Enough	Adequate
FA 13	Navlakha	Extensive	Extensive	Extensive	Extensive	Extensive	Adequate	Adequate
SP 14	Irvine	Adequate	Extensive	Extensive	Extensive	Extensive	Adequate	Adequate
SP 14	Pelin	Extensive	Not Enough	Extensive	Extensive	Adequate	Adequate	Adequate
SU 14	Weiss	Extensive	Extensive	Extensive	Extensive	Extensive	Adequate	Extensive
FL 14	Bajuelos	Extensive	Extensive	Extensive	Adequate	Extensive	Extensive	Adequate
SP 15	Navlakha	Extensive	Extensive	Extensive	Extensive	Extensive	Adequate	Adequate
SP 15	Pelin	Extensive	Extensive	Extensive	Adequate	Adequate	Adequate	Extensive
SP 15	Bajuelos	Extensive	Adequate	Extensive	Extensive	Extensive	Extensive	Adequate

**Table 3530-5: ISA - Instructor Appraisal of Coverage of COP 3530 Course Outcomes**

Analysis (Outcomes)

- 1) The value of each individual Course Outcome (**Table 3530-2**) is rated by students at 82% (4.10/5) or higher. The overall value rating (**Table 3530-3**) is 92% (4.60/5). The CES students' value ratings are consistent with the **Table 3350-4** individual ICA ratings of *Essential* (predominately) or *Appropriate* for all Course Outcomes.
- 2) The CES coverage of Course Outcomes O1 (Algorithm Analysis), O3 (Linked Lists & Binary Trees), O4 (Advanced Data Structures), and O7 (Data Structure Library) are each rated at or above 75% (3.75/5) in all semesters.
- 3) The CES coverage of Course Outcomes O2 (Recursive Algorithms) is below 75% (3.75/5) in three of the surveyed semesters: FL 13, SP 14, FL 14 (**Table 3530-2**). The SP 14 3.45 rating is consistent with the ISA appraisal of *Not Enough* (**Table 3530-5**). The FL 13 and FL 14 ratings, 3.70 and 3.66 respectively, are not much below 3.75, but are rated *Extensive* in the ICA surveys (**Table 3530-5**).
- 4) The CES coverage of Course Outcomes O5 (Sub-quadratic Sorting) is 3.55, below 75% (3.75/5) in one surveyed semester: SP 14 (**Table 3530-2**). The ICA Coverage rating is *Adequate* (**Table 3530-5**).

- 5) The CES coverage of Course Outcomes O6 (Graph Algorithms) is below 75% (3.75/5) in two of the surveyed semesters: 3.62 in SU 14, and 3.74 in FL 14 (**Table 3530-2**). The ICA Coverage rating is **Adequate** for SU 14 and **Extensive** for FL 14 (**Table 3530-5**).
- 6) The ISA coverage ratings of Course Outcomes O6 (Graph Algorithms) and O7 (Data Structure Library) are, on average, **Adequate** only in contrast with the **Extensive** ratings for all other Outcomes.
- 7) The following Instructors' recommendation may be pertinent here:
  - (SP '15 Bajuelos) *COP-3530 Data Structure is a very important course for computer science and IT students. I consider that it is important to be able to find time to solve, in class, more exercises from the recommended book.*

### C. Prerequisites and Student Preparedness

- PO1.** Master the design and implementation of classes using inheritance and polymorphism  
**PO2.** Master the use and implementation of interfaces  
**PO3.** Be exposed to writing recursive methods  
**PO4.** Be familiar with the implementation of linked list data structures  
**PO5.** Be familiar with the Stack & Queue data structures  
**PO6.** Be exposed to the Java Collection interface

		PreqO1	PreqO2	PreqO3	PreqO4	PreqO5	PreqO6
COP 3530		Inheritance	Interfaces	Recursion	Linked Lists	Stacks & Queue	Collection
SU 13							
FA 13	Pelin	Highly Useful	Highly Useful	Highly Useful	Useful	Useful	Useful
FA 13	Navlakha	Useful	Highly Useful	Highly Useful	Highly Useful	Highly Useful	Useful
SP 14	Irvine	Highly Useful	Highly Useful	Highly Useful	Highly Useful	Highly Useful	Highly Useful
SP 14	Pelin	Highly Useful	Highly Useful	Highly Useful	Useful	Useful	Useful
SU 14	Weiss	Highly Useful	Highly Useful	Useful	Useful	Useful	Useful
FL 14	Bajuelos	Useful	Useful	Useful	Useful	Useful	Useful
SP 15	Navlakha	Useful	Highly Useful	Highly Useful	Highly Useful	Highly Useful	Useful
SP 15	Pelin	Highly Useful	Highly Useful	Highly Useful	Useful	Useful	Useful
SP 15	Bajuelos	Useful	Useful	Useful	Useful	Useful	Useful

**Table 3530-6: Instructor Appraisal of Prerequisite Outcome Relevance**

		Preq O1	Preq O2	Preq O3	Preq O4	Preq O5	Preq O6	General
COP 3530		Inheritance	Interfaces	Recursion	Linked Lists	Stack & Queue	Collection	Preparation
SU 13								
FA 13	Pelin	Deficient	Deficient	Deficient	Deficient	Deficient	Deficient	Deficient
FA 13	Navlakha	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
SP 14	Irvine	Good	Good	Good	Good	Good	Good	Good
SP 14	Pelin	Adequate	Adequate	Deficient	Deficient	Deficient	Adequate	Deficient
SU 14	Weiss	Deficient	Deficient	Deficient	Adequate	Adequate	Adequate	Deficient
FL 14	Bajuelos	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
SP 15	Navlakha	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
SP 15	Pelin	Adequate	Adequate	Deficient	Deficient	Adequate	Adequate	Adequate
SP 15	Bajuelos	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate

**Table 3530-7: Instructor Appraisal of Prerequisite Outcome Mastery & General Preparedness**

#### Analysis (Prerequisites)

- 1) All COP 3530 Prerequisite Outcomes are rated as *Highly Useful* or *Useful* by all instructors (**Table 3530-6**).
- 2) Student mastery of all but 2 prerequisite outcomes (PO5 and PO6) was rated as *Deficient* by two COP 3530 instructors. Mastery of PO5 and PO6 were rated *Deficient* by one COP 3530 instructor. With one exception, all other prerequisite outcome ratings were *Adequate* only (**Table 3530-7**).

The following comment relating to student preparedness was offered by one instructor:

- (SU '14, Weiss) *In this large class there was a low success rate. Those who did well did very well. The others demonstrates a general lack of overall programming and problem solving ability not easily captured in the prerequisite objectives.*

#### D. Student Suggestions

A number of students' suggestions are available from the CES semester summaries.

#### E. Instructor Recommendations

See the recommendations listed in Section B (Bajuelos), and Section C (Weiss) above.

#### F. SAC Recommendations

The CES (student) and ICA (instructor) ratings of the coverage of some COP 3530 Course Outcomes seem to be conflicting – see Analysis (Outcomes) bullets 3, 4 & 5 above. There are also three ISA indications of Not Enough time spent on an Outcome – see **Table 3530-5**. These circumstances may be the result of disproportionate time spent elsewhere. There is also Bajuelos' recommendation, in Analysis (Outcomes) bullet 7, perhaps suggestive of time-pressure in covering topics. The common syllabus differentiates mastery levels, and includes recommendations of number of lecture hours for the various topics.

**Recommendation SAC3350-1:** Faculty who regularly teach COP 3530 should collectively review the COP 3530 syllabus with a view towards (re)defining content, emphasis, and time-allocation, and designing a complete set of attainable learning outcomes for this course.

It is hoped that recommendations proposed for COP 2210 and COP 3337 will have an ameliorating effect on the concern expressed by Weiss in Analysis (Prerequisites) bullet 2.

## COP 4338 Computer Programming III

This is a **required** course in the BS-CS curriculum. It is offered in every semester.

### A. Course Delivery

COP 4338		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Appropriate Homework
SU '13	14	4.29	4.64	3.71	4.64
FA '13	34	4.56	4.68	4.26	4.76
SP '14	39	4.44	4.46	4.21	4.41
SU '14	17	4.65	4.24	4.35	4.76
FA '14	39	4.15	3.85	3.82	4.18
SP '15	34	4.47	4.00	3.97	4.62
<b>ALL</b>	<b>177</b>	<b>4.41</b>	<b>4.27</b>	<b>4.06</b>	<b>4.52</b>

**Table 4338-1: Survey of COP 4338 Course Delivery**

### Analysis (Delivery)

With the exception of *Suitable Textbook* in SU '13, all aspects of COP 3337 course delivery are rated above the 75% level (3.75/5) in each semester.

### B. Course Outcomes

- O1. Master C basic types, arrays, and pointers
- O2. Be familiar with the UNIX utilities such as Makefile, and debugging using gdb
- O3. Master standard Input/Output
- O4. Be familiar with process address spaces: Data, Heap, Code, and Stack
- O5. Master dynamic memory management
- O6. Master multithreading and synchronization
- O7. Master writing program solutions to problems using the above features

COP 4338		CES Value and Coverage of Course Outcomes													
Term	#	O1		O2		O3		O4		O5		O6		O7	
		Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
SU 13	14	4.36	4.43	4.57	4.41	4.50	4.57	4.50	4.50	4.21	4.31	4.50	4.62	4.50	4.66
FA 13	34	4.79	4.76	4.88	4.79	4.71	4.55	4.85	4.76	4.71	4.66	4.80	4.70	4.76	4.88
SP 14	39	4.74	4.33	4.87	4.54	4.56	3.95	4.77	4.51	4.59	3.85	4.74	4.36	4.71	4.23
SU 14	17	4.65	3.82	4.76	3.82	4.18	3.69	4.82	4.59	4.65	3.88	4.53	3.59	4.41	2.71
FA 14	39	4.38	3.87	4.56	4.27	4.41	3.97	4.51	3.97	4.38	3.95	4.46	3.84	4.33	3.82
SP 15	63	4.68	4.19	4.70	4.43	4.44	3.97	4.70	3.44	4.48	3.97	4.57	4.13	4.59	4.14
<b>ALL</b>	<b>206</b>	<b>4.63</b>	<b>4.24</b>	<b>4.73</b>	<b>4.43</b>	<b>4.48</b>	<b>4.08</b>	<b>4.70</b>	<b>4.13</b>	<b>4.52</b>	<b>4.07</b>	<b>4.61</b>	<b>4.20</b>	<b>4.57</b>	<b>4.14</b>

**Table 4338-2: Value and Coverage of COP 4338 individual Course Outcomes**

COP 4338 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
SU 13	14	4.45	4.52
FA 13	34	4.79	4.67
SP 14	39	4.71	4.25
SU 14	17	4.57	3.73
FA 14	39	4.44	3.95
SP 15	63	4.59	4.16
ALL	206	4.61	4.21

**Table 4338-3: CES Overall Value and Coverage of COP 4338 Course Outcomes**

ICA Appropriateness and Coverage of Course Outcomes							
COP 4338	O1	O2	O3	O4	O5	O6	O7
<i>Appropriateness</i>	Essential	Appropriate	Essential	Very App.	Essential	Essential	Essential
<i>Coverage</i>	Extensive	Adequate	Extensive	Adequate	Extensive	Extensive	Extensively

**Table 4338-4: Instructor Appraisal of COP 4338 Course Outcomes**

#### Analysis (Outcomes)

- 1) The value of each individual Course Outcome (**Table 4338-2**) is rated by students at 84% (4.21/5) or higher. The overall value rating (**Table 4338-3**) is above 92% (4.61/5). The CES students' ratings are consistent with the **Table 4338-4** overall ICA ratings for all COP 4338 Course Outcomes.
  - (SP '14, Bobadilla) *I think that the content of the course is quite relevant and important for students. For most of them it is their first contact with Unix, Threads, Interprocess communication, etc.*
- 2) There seems to have been some issues with the coverage of Course Outcomes in SU '14 semester, as evidenced by coverage ratings that are lowest in any semester for 5 of the 7 Course Outcomes (**Table 4338-2**), including 3 coverage ratings that are below 75% (3.75/5). This is also reflected in the overall coverage rating of 3.73 (**Table 4338-3**).
- 3) The coverage of each individual Course Outcome, averaged over ALL semesters, is above 81% in all cases (**Table 4338-2**), with an overall coverage rating of 84% (4.21/5) in **Table 4338-3**. These CES indicators are consistent with the ICA coverage ratings of *Extensive* or *Adequate* in **Table 4338-4**.

#### C. Prerequisites and Student Preparedness

PO1. Significant programming experience in a modern programming language

PO2. Basic knowledge of UNIX systems

#### Analysis (Prerequisites)

- 1) Students rate their preparedness for taking COP 4338 at over 88% (4.41/5) in **Table 4338-1**.

- 2) Prerequisite Outcome PO2 (above) is not enabled by the BS-CS curriculum. This is reflected in numerous student comments in the CES surveys.
- (FL 14) *The second part is that the professor assumes that we know LINUX or that we have to learn Linux in 3 days again. But without basis and without an introductory course of Linux by part of the University that is difficult.*
  - (FL 14) *I understand that the unix environment is useful for understanding the concepts taught in this course, but I feel like it would have been better if, as a prerequisite for this course, that we could have been taught on how to use it properly.*
  - (SP 15) *If the class is taught using an operating system that was not used in the previous programming classes, then the students should not be expected to progress as if they have finished the previous courses using that operating system. In specific terms, all the previous classes were taught with Windows operating system, this class had the professor teaching in Mac and requiring the assignments to be done via Unix. The class started of expecting students to be as fluent with Unix as they were with Windows, and did not give time to catch up on learning how to use it.*
- 3) The ICA survey instruments do not yet reflect the modified prerequisite outcomes of COP 4338 listed above. Accordingly, several instructor ratings of the prerequisites are *Incidental or Irrelevant*.

#### D. Student Suggestions

A number of students' suggestions are available from the CES semester summaries.

#### E. Instructor Recommendations

#### F. SAC Recommendations

**Prerequisite Outcome PO2.** *Basic knowledge of UNIX systems* is nowhere else enabled in the BS-CS curriculum. The ISA survey is outdated.

Recommendation SAC4338-1: *Basic knowledge of UNIX systems* should be removed as a Prerequisite Outcome of COP 4338, and the corresponding knowledge units incorporated into the operational syllabus of COP 4338 (or some prerequisite course).

Recommendation SAC4338-1: The COP 4338 ICA survey instrument must be updated to include the modified Prerequisite Outcomes.

## COP 4226 Advanced Windows Programming

This is an **elective** course in the BS-CS curriculum. It is offered once per year in the Fall semester.

### A. Course Delivery

COP 4226		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Appropriate Homework
FA '13	8	4.50	4.00	4.75	3.38
FA '14	6	4.83	4.83	4.83	4.33
<b>ALL</b>	<b>14</b>	<b>4.64</b>	<b>4.36</b>	<b>4.78</b>	<b>3.79</b>

**Table 4226-1: Survey of COP 4226 Course Delivery**

#### Analysis (Delivery)

- 1) The low Appropriate Homework rating from FA '13 has been raised from 3.38 to 4.33. All aspects of COP 4226 Course Delivery are above 75% (3.75/5).

### B. Course Outcomes

O1: Master the Application Framework, Message Passing and Event Handling

O2: Master the graphics interface using Colors, Pens, Brushes, Fonts for Text and Shapes

O3: Master Modal and Modeless Dialog Windows

O4: Master Menus, Keyboard Accelerators, Toolbars and Status Bars

O5: Master Document and Dialog based applications.

O6: Be familiar with the Common Controls and Dialogs

O7: Be familiar with Database Connectivity, Serialization, Drag and Drop, and Multithreaded Programming

O8: Master programming for a visual environment

COP 4226		CES Value and Coverage of Course Outcomes													
Term	#	O1		O2		O3		O4		O5		O6		O7	
		Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
FA 13	8	4.00	4.43	4.75	4.75	4.00	4.14	4.50	4.50	3.43	3.29	2.62	2.88	3.38	3.00
FA 14	6	4.33	4.33	4.67	4.67	4.00	3.83	5.00	4.83	4.17	3.83	3.83	3.83	4.33	4.33
<b>ALL</b>	<b>14</b>	<b>4.14</b>	<b>4.39</b>	<b>4.72</b>	<b>4.72</b>	<b>4.00</b>	<b>4.01</b>	<b>4.71</b>	<b>4.64</b>	<b>3.75</b>	<b>3.52</b>	<b>3.14</b>	<b>3.29</b>	<b>3.79</b>	<b>3.57</b>

**Table 4226-2: Value and Coverage of COP 4226 individual Course Outcomes**

COP 4226 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
FA 13	8	3.81	3.85
FA 14	6	4.33	4.24
<b>ALL</b>	<b>14</b>	<b>4.03</b>	<b>4.02</b>

**Table 4226-3: CES Overall Value and Coverage of COP 4226 Course Outcomes**

ICA Appropriateness and Coverage of Course Outcomes								
COP 4226	O1	O2	O3	O4	O5	O6	O7	O8
<b>Appropriateness</b>	Essential	Essential	Essential	Appropriate	Very App.	Appropriate	Appropriate	Essential
<b>Coverage</b>	Extensive	Extensive	Extensive	Adequate	Adequate	Adequate	Adequate	Extensive

**Table 4226-4: Instructor Appraisal of COP 4226 Course Outcomes**

### Analysis (Outcomes)

CES data is available for only 7 of 8 COP 4226 Course Outcomes. In **Table 4226-2**, the available data is assigned, in the order reported, to Outcomes 1 through 7, so the association of data with outcomes is uncertain. Accordingly, no assessment of individual outcomes is presented.

- 1) The overall CES value ratings, 3.81 and 4.33, both exceed 75% (3.75/5) in both surveyed semesters (**Table 4226-3**). The ISA value ratings of COP 4226 Course Outcomes range from *Essential* to *Appropriate* (**Table 4226-4**).
- 2) The overall CES coverage ratings, 3.85 and 4.24, both exceed 75% (3.75/5) in both surveyed semesters (**Table 4226-3**). The ISA coverage ratings of COP 4226 Course Outcomes are all either *Extensive* or *Adequate* (**Table 4226-4**).

### **C. Prerequisites and Student Preparedness**

- PO1.** Basic techniques of algorithm analysis
- PO2.** Linked data structures such as linked lists
- PO3.** Advanced data structures such as hash tables
- PO4. Standard data structure library of a major programming language
- PO5. Polymorphism and inheritance
- PO6. Interfaces and abstract classes

### Analysis (Prerequisites)

- 1) **Students rate their preparation or taking COP 4226 at 93% (4.64/5) (Table 4226-1).**
- 2) The ICA summaries show ratings of either *Good* or *Adequate* for student mastery of prerequisite outcomes.
- 3) The ICA summaries show ratings either *Good* or *Adequate* for student overall preparedness.

### **D. Student Suggestions**

### **E. Instructor Recommendations**

### **F. SAC Recommendations**

Recommendation **SAC4226-1**: The COP 4226 CES survey instrument is faulty (See Analysis (Outcomes) above) and must be updated.



## COP 4520 Introduction to Parallel Programming

This is an **elective** course in the BS-CS curriculum. It is offered once per year in the Spring semester.

### A. Course Delivery

COP 4520		CES Survey of Course Delivery			
Term	#	Adequate Preparation	Appropriate Difficulty	Suitable Textbook	Appropriate Homework
SP '14	9	4.44	4.56	4.11	4.56
SP '15	3	4.33	3.33	3.00	4.33
<b>ALL</b>	<b>12</b>	<b>4.41</b>	<b>4.25</b>	<b>3.83</b>	<b>4.50</b>

**Table 4520-1: Survey of COP 4520 Course Delivery**

#### Analysis (Delivery)

- 1) The SP '15 ratings of the Difficulty Level (3.33) and Textbook Suitability (3.00) are below 75% (3.75/5) (**Table 4520-1**).
- 2) The combined SP '14, SP '15 ratings are above 75% (3.75/5) for all Course Delivery aspects of COP 4520 (**Table 4520-1**).

### B. Course Outcomes

1. Be familiar with parallel algorithm design.
2. Be familiar with parallel performance analysis.
3. Master the MPI programming paradigm.
4. Be familiar with POSIX multi-threaded programming.
5. Be familiar with OpenMP programming.
6. Be exposed to parallel applications.

COP 4520		CES Value and Coverage of Course Outcomes											
		O1		O2		O3		O4		O5		O6	
Term	#	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover	Value	Cover
SP 14	9	4.78	4.56	4.89	4.88	4.78	4.62	4.89	4.44	4.62	4.44	4.89	4.44
SP 15	3	4.33	4.67	4.33	4.00	4.33	4.50	4.00	4.33	4.33	4.33	4.33	4.33
<b>ALL</b>	<b>12</b>	<b>4.67</b>	<b>4.59</b>	<b>4.75</b>	<b>4.66</b>	<b>4.67</b>	<b>4.59</b>	<b>4.67</b>	<b>4.41</b>	<b>4.55</b>	<b>4.41</b>	<b>4.75</b>	<b>4.41</b>

**Table 4520-2: Value and Coverage of COP 4520 individual Course Outcomes**

COP 4520 Overall Value & Coverage of Outcomes			
Term	# Responses	Value	Coverage
SP 14	9	4.81	4.56
SP 15	3	4.28	4.38
<b>ALL</b>	<b>12</b>	<b>4.68</b>	<b>4.52</b>

**Table 4520-3: CES Overall Value and Coverage of COP 4520 Course Outcomes**

ICA Appropriateness and Coverage of Course Outcomes						
COP 4520	O1	O2	O3	O4	O5	O6
<i>Appropriateness</i>	Essential	Essential	Very Appr.	Very Appr.	Essential	Very Appr.
<i>Coverage</i>	Extensive	Extensive	Adequate	Adequate	Extensive	Adequate

**Table 4520-4: Instructor Appraisal of COP 4520 Course Outcomes**

Analysis (Outcomes)

- 1) The value of each individual Course Outcome (**Table 4520-2**) is rated by students at 80% (4.00/5) or higher. The overall value rating (**Table 4520-3**) is above 93% (4.68/5). The CES students' ratings are consistent with the **Table 4520-4** overall ICA ratings of *Essential* or *Very Appropriate* for all Course Outcomes.
- 2) The coverage of each individual Course Outcome (**Table 4520-2**) is rated by students at 80% (4.00/5) or higher. The overall coverage rating (**Table 4520-3**) is above 90% (4.52/5). The CES student ratings are consistent with the **Table 4520-4** individual ICA ratings of *Extensive* or *Adequate* for all Course Outcomes.

**C. Prerequisites and Student Preparedness**

**PO1.** Programming experience in C or C++

**PO2.** Basic knowledge of undergraduate level algorithms, data structures, and computer organization

Analysis (Prerequisites)

- 1) **Students rate their preparedness for taking COP 4520 at over 88% (4.41/5) in Table 4520-1.**
- 2) There are no ICA ratings of Prerequisite Outcome PO1 (C, C++ programming).
- 3) The Data Structures and Computer Organization components of Prerequisite Outcome PO2 are separately rated as *Highly Useful* in the ICA summaries.
- 4) Student mastery of the Data Structures and Computer Organization components of Prerequisite Outcome PO2 are separately rated as *Good* in the ICA summaries

**D. Student Suggestions**

**E. Instructor Recommendations**

**F. SAC Recommendations**

Recommendation SAC4520-1: Prerequisite Outcome **PO1.** *Programming experience in C or C++* is not enabled in the prerequisite chain of COP 4520 and should be removed. It may be worth considering adding COP 4338 as a co-requisite to COP 4520.



## Summary of Recommendations

**Recommendation SAC2210-1:** SCIS should provide a pre-programming course focused on problem-solving and logic skills, and that introduces the algorithmic process, abstraction and some computer programming using a minimal-syntax non-production programming language and IDE. Such a course must have clearly defined learning outcomes and evaluation methodologies.

**Recommendation SAC2210-2:** SCIS should require all students enrolled in COP 2210 to complete an evaluation no later than the first week of class, and preferably earlier, in order to recommend to the student whether to continue their COP 2210 registration, or in the pre-programming course instead.

**Recommendation SAC2210-3:** The COP 2210 common syllabus should be redesigned around carefully constructed learning outcomes that direct the focus of students and instructors towards abstraction, problem solving and the algorithmic process.

**Recommendation SAC2210-4:** SCIS should rethink the objectives and delivery mode of COP 2210 to reflect the role of this class as the introduction to the study and practice of Computer Science.

**Recommendation SAC3337-1:** The COP 3337 common syllabus should be redesigned around carefully constructed learning outcomes that direct the focus of students and instructors towards abstraction, problem solving and the algorithmic process.

**Recommendation SAC3337-2:** The operational syllabi of COP 2210 and COP 3337 must be integrated to ensure a seamless transition from COP 2210 into COP 3337 for both students and instructors. This can be facilitated by various means including

1. Clear articulation of learning outcomes for both COP 2210 and COP 3337.
2. Clear articulation of expected programming experiences for students in both classes, including critical feedback on students' programming style and methodology:
3. Common exams for all sections of COP 2210 designed to test achievement of the learning outcomes. These need not be a complete final exam, but could be, for example, a ½ hour multiple-choice quiz. This must contribute towards the student's class grade, either as part of a final exam, or as a stand-alone activity.
4. Scheduled meeting(s) of instructors of both classes at least once towards the end of each semester.

**Recommendation SAC3350-1:** Faculty who regularly teach COP 3530 should collectively review the COP 3530 syllabus with a view towards (re)defining content, emphasis, and time-allocation, and designing a complete set of attainable learning outcomes for this course.

**Recommendation SAC4338-1:** *Basic knowledge of UNIX systems* should be removed as a Prerequisite Outcome of COP 4338, and the corresponding knowledge units incorporated into the operational syllabus of COP 4338 (or some prerequisite course).

**Recommendation SAC4338-1:** The COP 4338 ICA survey instrument must be updated to include the modified Prerequisite Outcomes.

Recommendation SAC4226-1: The COP 4226 CES survey instrument is faulty (See Analysis (Outcomes) above) and must be updated.

Recommendation SAC4520-1: Prerequisite Outcome **PO1**. *Programming experience in C or C++* is not enabled in the prerequisite chain of COP 4520 and should be removed. It may be worth considering adding COP 4338 as a co-requisite to COP 4520.

## Assessment of 2013 - 2015 - Foundations Courses

Xudong He

September 28, 2015

### 1 Introduction

The Foundations courses are COT 3420 (Logic for Computer Science), COP 4555 (Principles of Programming Languages), COT-4534 (Algorithm Techniques), 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 COT 3420 Logic for Computer Science

Alex Pelin taught a section of COT 3420 in Summer 2013. Christine Lisetti taught a section COT 3420 in Fall 2013.

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 13	8	4.16	4.39
Fall 13	18	4.69	4.77
	=====	=====	=====
Year 2013	26	4.53	4.65

Overall the evaluations are excellent. Comments with Alex Pelin's teaching were using a less formal approach in presenting the subject, and providing learning aides. Comments with Christine Lisetti's teaching were generally very positive, and mentioning her excellent presentation. Some student suggested of using more realistic examples than Prolog examples in discussing how to use logic in computer science.

Both Alex Pelin and Christine Lisetti noted that the students did not have adequate preparation. Alex Pelin commented on the continual deterioration of student quality and lack of motivation. Christine commented on that student's lack of understanding of induction and essential concepts of propositional logic forced her to sacrifice the coverage of first order logic, but students appreciated her examples on logical agents from AI courses.

### 3 COP 4555 Principles of Programming Languages

Jai Navlakha taught one section of COP 4555 in Summer 2013 and Fall 2014. Geoff Smith taught one section of COP 4555 in Fall 2013, Spring 2014, and Spring 2015. Xudong He taught one section of COP 4555 in Summer 2014.

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 13	9	4.56	4.26
Fall 13	31	4.61	4.57
Spring 14	25	4.44	4.55
Summer	6	4.61	4.61
Fall 14	29	4.18	4.20
Spring 15	37	4.47	4.26
	=====	=====	=====
Year 2013-15	137	4.45	4.39

The overall student evaluations were very good. Geoff Smith taught this class most of the times. Both Jai Navlakha and Xudong He taught this course once during two summers. Geoff Smith and Jai Navlakha (who mainly used Geoff Smith's notes) covered F# language extensively with some type inference. Xudong He covered F# for half of the semester based on Geoff Smith's notes and covered more general programming design and implementation issues in the other half of the semester. Overall many students liked the course and had very positive comments about the instructors. Several students noted that Geoff Smith is an excellent instructor. A common comment was about covering less F# language and covering other programming languages also in this class. Some students commented on having a text book. Several students commented the short summer session was not enough to learn the materials well.

Students' preparation for this course ranges from deficient (Fall 13, Spring 14, and Fall 14), adequate (Summer 14 and Spring 15), to good (Summer 13). Geoff Smith commented on many students routinely obtaining homework solutions elsewhere without making real effort and started to make closed note exams. Geoff Smith also changed the grading criteria of homework from correctness to efforts to discourage the wide spread cheating on homework assignments starting in Spring 2014. Geoff Smith noted the positive effect of grading based on effort in Spring 2015, but the disappointing student performance on the final exam. Xudong He adopted a new textbook for this course in Summer 2014, and reduced the coverage of F# to half of the semester. More broad topics of programming language design and implementation were covered in the other half of the semester.

#### 4 COT- 4534 Algorithm Techniques

Mark Weiss taught one section of COP 4534 in Fall 2013 and Fall 2014. Antonio Bajuelos taught one section of COP 4534 in Spring 2015.

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 13	18	4.93	4.77
Fall 14	17	4.86	4.80
Spring 15	5	4.67	4.67
	=====	=====	=====
Year 2013-15	40	4.87	4.77

The overall student evaluations were outstanding. Several students' comments mentioned Mark Weiss was a great professor and this course was a very good one. Several students mentioned the course was hard in

Fall 2013, while there was no such comment in Fall 2014. It is obvious Mark Weiss made some adjustment to address the problem.

Students' preparation for this course ranges from adequate (Fall 14 and Spring 15) to good (Fall 13). Antonio Bajuelos commented to have more exercises from the recommended book and to study more classical problems from computational geometry.

## **5 Recommendations**

There are some persistent problems in two of the above foundation courses. In COT 3420, students lack of background. In COP 4555, there is a wide spread of plagiarism in homework assignment. For COT 3420, one possible solution is to offer our own Discrete Math course, which covers some materials such as propositional logic and induction, thus complements COT 3420. For COP 4555, Geoff Smith has changed grading criteria of homework from purely correctness to include effort to discourage homework copying. To improve students understanding and performance on exams, using (in class and/or on-line) quizzes is recommended.



# Professional Development Subject Area Report

Prepared Fall 2015 by Rick Blazek

This report covers the period from Summer 2013 through Summer 2015. It summarizes and analyzes the data from the SCIS Course Evaluation System's Course Outcomes Surveys for the BS-CS courses in the Professional Development subject area:

CGS-1920 Introduction to Computing  
CGS-3095 Technology in the Global Arena – GL  
ENC-3249 Professional and Technical Writing for Computing

The Course Outcomes Survey is intended to be completed at the end of each semester by each student registered in any required or elective course of the BS-CS major. Students are surveyed on aspects of the course delivery, and on the value and coverage of each course outcome. The assessment report given below for each of these courses is based on student responses about the course outcomes and the faculty course appraisals.

## Review of CGS 1920

	No of Student Responses	Value of Outcome	Coverage Adequacy
Summer 2013	2	5.00	4.86
Fall 2013	120	4.68	4.67
Spring 2014	11	4.60	4.61
Summer 2014	N/A		
Fall 2014	163	4.74	4.71
Spring 2015	24	4.60	4.53
Summer 2015	N/A		
Total:	320	4.70	4.68

More than half of the students in this course are not pursuing SCIS degrees (100% SU13, 59% FA13, 36.36% SP14, 60% FA14, 54% SP15), and view the outcome: "Be familiar with the scope of degree programs in the computing field" very favorably. A minority who appeared to have already chosen a computer major felt that the course did not provide enough technical detail. No common issues were identified.

**Recommendation:** No changes are recommended.

## Review of CGS 3095

	No of Student Responses	Value of Outcome	Coverage Adequacy
Summer 2013	26	4.77	4.83
Fall 2013	38	4.70	4.76

Spring 2014	46	4.83	4.81
Summer 2014	41	4.65	4.73
Fall 2014	61	4.62	4.71
Spring 2015	84	4.64	4.69
Summer 2015	N/A		
Total:	296	4.69	4.76

A minority objected to the course and felt its position in their major was not adequately justified. The majority strongly felt the course was beneficial. Both groups commended the quality of the instruction. A few students felt that there were too many assignments and activities.

**Recommendation:** No changes are recommended.

### **Review of ENC-3249**

There was no CES Assessment data for this course. Since technical writing is required in the CGS 3095 course and since the research paper requirement was well received by the students in the GL course, it appears that the outcomes of ENC 3249 were adequately met from the students' perspective. However, CGS 3095 instructors were surveyed each term regarding prerequisites. Their assessment was that although ENC 3213 Professional and Technical Writing was highly useful to useful, students were deficient to adequate in writing skills.

**Recommendation:** No changes are recommended. However, emphasis on technical writing skills should be renewed in this course.

**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.

SE I CEN 4010	Prerequisite				Student Preparedness
	COP 3530 Data Structures				
	Programming		Data Structures		
	Relevance	Mastery	Relevance	Mastery	
Summer 2013	Useful	Adequate	Useful	Adequate	Good
Fall 2013	Highly Useful	Adequate	Highly Useful	Adequate	Adequate
Spring 2014	Highly Useful	Good	Useful	Good	Adequate
Spring 2015	Highly Useful	Adequate	Useful	Adequate	Adequate

According to the survey by 100 students, the average overall outcome is 4.61 out of 5 and the average coverage adequacy is 4.39 out of 5.

SE I CEN 4010	# Responding	Overall Outcome	Coverage Adequacy
Summer 2013	4	4.53	4.56
Fall 2013	20	4.77	4.55
Spring 2014	21	4.36	3.98
Summer 2014	16	4.88	4.63
Fall 2014	20	4.48	4.31
Spring 2015	19	4.67	4.51
<b>Year 2013-15</b>	<b>100</b>	<b>4.61</b>	<b>4.39</b>

**Instructors’ comments:**

- Students need to learn how to work in teams.
- Students should have a similar background.

**Students’ comments:**

- Regarding the homework assignments and exams:
  - More time for exams
  - No exams
  - Less homework
  - Memorizing should not be so important in this course.
- Regarding the syllabus and textbook:

- Syllabus would need to be improved.
    - The textbook used was a little outdated.
  - Regarding the prerequisites:
    - Database should be a prerequisite
    - Web development should be a prerequisite
  - Regarding the lectures:
    - A systematic, quantifiable approach to the development, operation, and maintenance of software
    - Real world experiences and actual software engineering scenarios
    - Experience of actual software development in the industry
    - More dynamic lectures
  - Regarding the projects:
    - Have a bank of projects that individual groups are allowed to choose from
    - More but smaller deliverables for more constant feedback
    - Proper documentation
    - More group sessions
    - Sample deliverables
- **Observations and Recommendations:**
  - Observations:
    - 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 bogged down with plenty of homework assignments and extra documentations that would be of no use to them in the future.
    - Our professors would like our students to perform better in their groups.
  - Recommendations:
    - Adopt the state-of-the-art practices of software development from industry.
    - Agile and more specifically, Scrum, is the solution.
    - Professors of this course should adopt an Agile/Scrum book.
    - 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 three times the past two years. According to one of the instructors of this course, the relevancy of the prerequisites was rated useful and mastery of the students was rated from deficient to adequate and good. Students' preparedness was indicated as adequate.

SE II CEN 4021	<b>Prerequisite</b>			<b>Student Preparedness</b>
	<b>CEN 4010 SE I</b>			
	<b>SW Life Cycle</b>	<b>Requirement Specification</b>	<b>Software Design &amp; Implementation</b>	

	<b>Relevance</b>	<b>Mastery</b>	<b>Relevance</b>	<b>Mastery</b>	<b>Relevance</b>	<b>Mastery</b>	
<b>Fall 2014</b>	Useful	Adequate	Useful	Good	Useful	Deficient	Adequate

According to the survey by 18 students, the average overall outcome is 4.67 out of 5 and the average coverage adequacy is 4.38 out of 5.

SE II CEN 4021	# Responding	Overall Outcome	Coverage Adequacy
Spring 2014	11	4.56	4.23
Fall 2014	1	5	5
Spring 2015	6	4.83	4.54
<b>Year 2011-13</b>	<b>18</b>	<b>4.67</b>	<b>4.38</b>

**Instructors' comments:**

- Better diagramming, white boarding skills and better presentation skills.
- Linking this course with Sr. Project would be nice as students can continue what they design in this class and get it implemented in Sr. Project the right way as I have seen a lot of example where students implement thing in Sr. Project the wrong way and just develop bad habits.

**Students' comments:**

- Very real world oriented with real life type project.
- IT teaches about current technologies in the field.
- There should be more courses like this one that relate to actual jobs.

• **Observations and Recommendations:**

- Agile/Scrum software development management should be adopted.
- The students from this course should be asked to manage the projects in Introduction to Software Engineering and Senior Project courses taught in the same semester.

**CEN 4072 – Software Testing & Verification**

• **Summary of Assessment:**

This course was taught four times during the past two years. According to the instructor of this course, the relevancy of the prerequisites was rated as useful and mastery of the students was rated as good. Students' preparedness was indicated as adequate.

Testing CEN 4072	Prerequisite		Student Preparedness
	COP 3530 Data Structures		
	Data Structures		
	Relevance	Mastery	
Fall 2013	Useful	Good	Adequate
Summer 2014	Useful	Good	Adequate
Fall 2014	Useful	Good	Adequate

According to the survey by 38 students, the average overall outcome is 4.52 out of 5 and the average coverage adequacy is 4.18 out of 5.

	# Responding	Overall Outcome	Coverage Adequacy
Fall 2013	19	4.37	4.11
Summer 2014	7	4.63	4.02
Fall 2014	12	4.7	4.39
Year 2011-13	38	4.52	4.18

**Instructors' comments:**

- The debugging topic needs to be removed from the syllabus. There is not enough time to cover debugging in the class.

**Students' comments:**

- This course should be mandatory because testing in a big part of the software development cycle.
- The amount of work for the deliverable is pretty extreme.
- Feel like the class should be more interactive as opposed to just theory.
- A lot of Students do not know how to use tomcat and MySQL when they come into the course. Professor should teach/train us how use them.

**• Observations and Recommendations:**

- 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.
- The lectures time should be spent more on practicing the testing/debugging methods using state-of-the-art tools.

**COP 4911 – Senior Project**

**• Summary of Assessment:**

This course was taught six times 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 from deficient to adequate and good. Students' preparedness was indicated from deficient to adequate and good.

Senior Project CIS 4911	Prerequisite				Student Preparedness
	CEN 4010 SE I				
	SW Dev. Process		Basic PM Concepts		
	Relevance	Mastery	Relevance	Mastery	

<b>Summer 2013</b>	Highly Useful	Deficient	Highly Useful	Deficient	Deficient
<b>Spring 2014</b>	Highly Useful	Adequate	Useful	Good	Deficient
<b>Summer 2014</b>	Highly Useful	Good	Highly Useful	Good	Good
<b>Fall 2014</b>	Highly Useful	Good	Highly Useful	Deficient	Adequate
<b>Spring 2015</b>	Highly Useful	Deficient	Useful	Deficient	Deficient

According to the survey by 70 students, the average overall outcome is 4.75 out of 5 and the average coverage adequacy is 4.45 out of 5.

<b>Senior Project CIS 4911</b>	<b># Responding</b>	<b>Overall Outcome</b>	<b>Coverage Adequacy</b>
<b>Summer 2013</b>	5	4.31	4.17
<b>Fall 2013</b>	22	4.86	4.39
<b>Spring 2014</b>	4	4.50	4.45
<b>Summer 2014</b>	9	4.84	4.61
<b>Fall 2014</b>	22	4.89	4.54
<b>Spring 2015</b>	8	4.39	4.33
<b>Year 2011-13</b>	<b>70</b>	<b>4.75</b>	<b>4.45</b>

**Instructors' comments:**

- Many of students lack the knowledge and application of software engineering, especially how to use UML diagrams properly.
- We practice Scrum, a popular agile software development approach, in our senior project, which is not being taught in CEN 4010. So, our students do not know how to develop software using this new agile method.

**Students' comments:**

- Preparation and Prerequisites:
  - At least provide a tutor for the class or better prepare students for this class.
  - More help on SE concepts would also be nice.
  - Better software engineering classes that teach UML diagrams better.
  - Easier to find and more complete software engineering information.
  - Software Engineering is nothing compare to this course. They expect me to know all the material from Software Engineering, which I took two semesters ago, in which I did not learn anything. You need to increase the difficulty of Software Engineering.
- Software Development Process:
  - Agile development would be preferred.
  - Would be nice to have more development time and fewer presentations.
  - I would recommend shifting the focus of the course into the project itself, leaving the professor to serve as a middle man between FIU and the project mentor,

allowing the mentor to entirely guide the development of the project and for the student's work on the project to be the evaluating factor.

- As it stands, too much of the course is focused on time-wasting presentations and misguided, unrealistic documentation requirements.
- Documentation is important, but the academic approach is unrealistic.
- Projects and Deliverables:
  - To please give more time between the deliverables.
  - Before selecting projects, it would be a great help to research what the project entails to avoid any issues when students have already started working on them.
  - Due dates for documentation would be great for keeping entire teams in track.
  - The Moodle website should really be updated with the proper deadlines, course schedule, and document requirements.
- **Observations and Recommendations:**
  - Agile software engineering, and more specifically, Scrum should be employed for all the projects in this class.
  - Students should be better prepared for this class starting
    - Students should better learn UML diagrams in CEN 4010 course.
    - Students should learn how to be a team member in a self-organizing Agile/Scrum development team.



**Subject Area: Computer Systems (Reported by Shu-Ching Chen)**

**Duration: Summer 2013 to Spring 2015**

COP 4710 Database Management  
CAP 4710 Principles of Computer Graphics  
CAP 4770 Introduction to Data Mining  
CEN 4083 Cloud Computing  
COP 4604 Advanced UNIX Programming  
COP 4722 Survey of Database Systems

**COP 4710 Database Management**

- *Appraisal and Course Evaluation Reports Status: This course was taught six times by three instructors during this period. The instructors have submitted all of the course appraisals for all the sessions. The student evaluation for all of the six sessions is available in the system.*
- *Summary of Assessment: This course has seven outcomes, all of which has 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:*

	# Responding	Outcome Value	Coverage Adequacy
Summer 2013	11	4.84	4.53
Fall 2013	18	4.7	4.57
Spring 2014	6	4.74	4.63
Summer 2014	18	4.74	4.56
Fall 2014	27	4.75	4.7
Spring 2015	41	4.73	4.45

**CAP 4710 Principles of Computer Graphics**

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

	# Responding	Outcome Value	Coverage Adequacy
Spring 2014	3	4.46	4.38
Spring 2015	5	4.78	3.92

### CAP 4770 Introduction to Data Mining

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

	# Responding	Outcome Value	Coverage Adequacy
Fall 2013	5	4.43	4.37
Spring 2014	5	4.43	4.37
Fall 2014	20	4.37	4.31

### CEN 4083 Cloud Computing

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

	# Responding	Outcome Value	Coverage Adequacy
Spring 2015	8	4.53	4.58

### COP 4604 Advanced Unix Programing

- *Appraisal and Course Evaluation Reports Status: This course was taught one time by one instructor during this period. The instructor didn't submit the course appraisal for this session. The student evaluation for this session is available in the system.*
- *Summary of Assessment: It is not available. No outcomes are specified.*
- *Recommendation: I recommend no changes to the outcome of this course.*

### COP 4722 Survey of Database Systems

- *Appraisal and Course Evaluation Reports Status: This course was taught four times by one instructor during this period. The instructor has submitted all of the course appraisals for all the sessions. The student evaluation for all of the four sessions is available in the system.*

- *Summary of Assessment: This course has five outcomes, all of which has 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:*

	# Responding	Outcome Value	Coverage Adequacy
Fall 2013	17	4.75	4.39
Spring 2014	16	4.16	4.09
Fall 2014	9	4.29	4.22
Spring 2015	31	4.33	4.12

**APPENDIX D-1: Exit (Graduating Student) Survey  
Raw Data and Statistics for Individual Semesters**

The raw data for individual semesters is available at <https://www3.cis.fiu.edu/alumni/admin/>. They are presented here along with statistical calculations. The aggregate data for five semesters from Summer 2013 to Spring 2015 (Summer 2014 data was not collected) along with statistical results are also included below.

			<b>SUMMER 2013 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS</b>								
<b>PROGRAM EDUCATIONAL OBJECTIVE</b>			<b>SCORES - # OF STUDENTS RESPONDING</b>				<b>TOT AL</b>	<b>NUM BER OF</b>	<b>AVE RAG E</b>		
			<b>Agr ee</b>	<b>Agree</b>	<b>Agree</b>	<b>Disag ree</b>	<b>Disag ree</b>	<b>Disag ree</b>	<b>WEI GHT ED</b>	<b>RESP ONS ES</b>	<b>SCO RE</b>
			<b>Stro ngly</b>	<b>Moder ately</b>	<b>Some what</b>	<b>Some what</b>	<b>Mode rately</b>	<b>Stron gly</b>	<b>SCO RE</b>		
			5	4	3	2	1	0			
Proficiency in Foundation Areas of Computer Science											
Outcome has been met for me personally			4	0	1	0	0	1	23	6	3.83
How meaningful the outcome is for me personally			3	1	1	0	0	1	22	6	3.67
Proficiency in Core Areas of Computer Science											
Outcome has been met for me personally			4	2	0	0	0	0	28	6	4.67
How meaningful the outcome is for me personally			4	2	0	0	0	0	28	6	4.67
Proficiency in Problem Solving											

Outcome has been met for me personally	3	3	0	0	0	0	27	6	4.50
How meaningful the outcome is for me personally	5	1	0	0	0	0	29	6	4.83
Proficiency in Programming Language									
Outcome has been met for me personally	4	2	0	0	0	0	28	6	4.67
How meaningful the outcome is for me personally	5	1	0	0	0	0	29	6	4.83
Understanding of Social and Ethical Issues									
Outcome has been met for me personally	4	0	2	0	0	0	26	6	4.33
How meaningful the outcome is for me personally	3	2	1	0	0	0	26	6	4.33
Ability to Work Cooperatively in Teams									
Outcome has been met for me personally	4	0	2	0	0	0	26	6	4.33
How meaningful the outcome is for me personally	5	0	1	0	0	0	28	6	4.67
Demonstrate Effective Communication Skills									
Outcome has been met for me personally	4	2	0	0	0	0	28	6	4.67
How meaningful the outcome is for me personally	5	1	0	0	0	0	29	6	4.83
Experience with Contemporary Environments and Tools									
Outcome has been met for me personally	4	0	1	0	0	1	23	6	3.83
How meaningful the outcome is for me	5	0	1	0	0	0	28	6	4.67

personally									
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FALL 2013 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS										
PROGRAM EDUCATIONAL OBJECTIVE			SCORES - # OF STUDENTS RESPONDING				TOTAL	NUMBER OF	AVE	RAG
			Agree	Agree	Agree	Disagree	Disagree	Disagree	WEIGHTED	SCORE
			Strongly	Moderately	Somewhat	Somewhat	Modestly	Strongly	SCORE	
			5	4	3	2	1	0		
Proficiency in Foundation Areas of Computer Science										
Outcome has been met for me personally			12	5	1	0	0	0	83	4.61
How meaningful the outcome is for me personally			16	2	0	0	0	0	88	4.89
Proficiency in Core Areas of Computer Science										
Outcome has been met for me personally			11	6	0	0	1	0	80	4.44
How meaningful the outcome is for me personally			15	3	0	0	0	0	87	4.83
Proficiency in Problem Solving										
Outcome has been met for me personally			11	6	0	1	0	0	81	4.50
How meaningful the outcome is for me personally			14	3	0	0	1	0	83	4.61
Proficiency in Programming Language										

Outcome has been met for me personally	14	4	0	0	0	0	86	18	4.78
How meaningful the outcome is for me personally	14	4	0	0	0	0	86	18	4.78
Understanding of Social and Ethical Issues									
Outcome has been met for me personally	11	5	2	0	0	0	81	18	4.50
How meaningful the outcome is for me personally	10	4	3	1	0	0	77	18	4.28
Ability to Work Cooperatively in Teams									
Outcome has been met for me personally	14	3	1	0	0	0	85	18	4.72
How meaningful the outcome is for me personally	16	2	0	0	0	0	88	18	4.89
Demonstrate Effective Communication Skills									
Outcome has been met for me personally	13	3	2	0	0	0	83	18	4.61
How meaningful the outcome is for me personally	14	3	1	0	0	0	85	18	4.72
Experience with Contemporary Environments and Tools									
Outcome has been met for me personally	7	8	2	1	0	0	75	18	4.17
How meaningful the outcome is for me personally	13	3	2	0	0	0	83	18	4.61

			SPRING 2014 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS							
			COMBINED RESULT OF OLD & NEW SURVEY INSTRUMENTS							
								TOT AL	NUM BER OF	AVE RAG E
PROGRAM EDUCATIONAL OBJECTIVE		SCORES - # OF STUDENTS RESPONDING					WEI GHT ED	RES P ONS ES	SCO RE	
			Agr ee	Agree	Agree	Disag ree	Disag ree	Disag ree	SCO RE	
			Stro ngly	Moder ately	Some what	Some what	Mode rately	Stron gly		
			5	4	3	2	1	0		
Proficiency in Foundation Areas of Computer Science										
Outcome has been met for me personally		17	7	3	0	0	0	122	27	4.52
How meaningful the outcome is for me personally		25	1	1	0	0	0	132	27	4.89
Proficiency in Core Areas of Computer Science										
Outcome has been met for me personally		20	7	0	0	0	0	128	27	4.74
How meaningful the outcome is for me personally		23	4	0	0	0	0	131	27	4.85
Proficiency in Problem Solving										
Outcome has been met for me personally		17	9	1	0	0	0	124	27	4.59
How meaningful the outcome is for me personally		24	1	2	0	0	0	130	27	4.81



Proficiency in Programming Language									
Outcome has been met for me personally	24	2	1	0	0	0	131	27	4.85
How meaningful the outcome is for me personally	25	2	0	0	0	0	133	27	4.93
Understanding of Social and Ethical Issues									
Outcome has been met for me personally	15	8	3	1	0	0	118	27	4.37
How meaningful the outcome is for me personally	21	2	1	2	0	1	120	27	4.44
Ability to Work Cooperatively in Teams									
Outcome has been met for me personally	16	6	3	1	1	0	116	27	4.30
How meaningful the outcome is for me personally	23	2	2	0	0	0	129	27	4.78
Demonstrate Effective Communication Skills									
Outcome has been met for me personally	16	9	1	1	0	0	121	27	4.48
How meaningful the outcome is for me personally	23	4	0	0	0	0	131	27	4.85
Experience with Contemporary Environments and Tools									
Outcome has been met for me personally	13	11	3	0	0	0	118	27	4.37
How meaningful the outcome is for me personally	24	2	1	0	0	0	131	27	4.85

FALL 2014 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS											
PROGRAM EDUCATIONAL OBJECTIVE			SCORES - # OF STUDENTS RESPONDING					TOTAL	NUMBER OF	AVERAGE	
			Agree	Agree	Agree	Disagree	Disagree	Disagree	WEIGHTED	RESPONSES	SCORE
			Strongly	Moderately	Somewhat	Somewhat	Modestly	Strongly	SCORE		
			5	4	3	2	1	0			
Proficiency in Foundation Areas of Computer Science											
Outcome has been met for me personally			14	6	4	0	0	0	106	24	4.42
How meaningful the outcome is for me personally			14	7	3	0	0	0	107	24	4.46
Proficiency in Core Areas of Computer Science											
Outcome has been met for me personally			13	9	2	0	0	0	107	24	4.46
How meaningful the outcome is for me personally			20	4	0	0	0	0	116	24	4.83
Proficiency in Problem Solving											
Outcome has been met for me personally			7	9	6	1	1	0	92	24	3.83
How meaningful the outcome is for me personally			17	7	0	0	0	0	113	24	4.71
Proficiency in Programming Language											
Outcome has been met for me personally			16	7	0	1	0	0	110	24	4.58

How meaningful the outcome is for me personally	20	4	0	0	0	0	116	24	4.83
Understanding of Social and Ethical Issues									
Outcome has been met for me personally	12	5	4	0	0	3	92	24	3.83
How meaningful the outcome is for me personally	11	9	3	0	0	1	100	24	4.17
Ability to Work Cooperatively in Teams									
Outcome has been met for me personally	15	4	4	0	1	0	104	24	4.33
How meaningful the outcome is for me personally	20	3	1	0	0	0	115	24	4.79
Demonstrate Effective Communication Skills									
Outcome has been met for me personally	14	3	6	1	0	0	102	24	4.25
How meaningful the outcome is for me personally	20	4	0	0	0	0	116	24	4.83
Experience with Contemporary Environments and Tools									
Outcome has been met for me personally	11	8	3	1	0	1	98	24	4.08
How meaningful the outcome is for me personally	20	4	0	0	0	0	116	24	4.83

			<b>SPRING 2015 GRADUATING STUDENT (EXIT) SURVEY - STATISTICS</b>								
								TOT AL	NUM BER OF	AVE RAG E	
PROGRAM EDUCATIONAL OBJECTIVE			SCORES - # OF STUDENTS RESPONDING				WEI GHT ED	RES P ONS ES	SCO RE		
			Agr ee	Agree	Agree	Disag ree	Disag ree	Disag ree	SCO RE		
			Stro ngly	Moder ately	Some what	Some what	Mode rately	Stron gly			
			5	4	3	2	1	0			
Proficiency in Foundation Areas of Computer Science											
Outcome has been met for me personally			9	11	2	0	1	0	96	23	4.17
How meaningful the outcome is for me personally			11	7	3	1	1	0	95	23	4.13
Proficiency in Core Areas of Computer Science											
Outcome has been met for me personally			11	7	3	0	2	0	94	23	4.09
How meaningful the outcome is for me personally			13	6	1	2	1	0	97	23	4.22
Proficiency in Problem Solving											
Outcome has been met for me personally			8	6	7	1	1	0	88	23	3.83
How meaningful the outcome is for me personally			13	5	2	1	2	0	95	23	4.13

Proficiency in Programming Language									
Outcome has been met for me personally	12	8	2	1	0	0	100	23	4.35
How meaningful the outcome is for me personally	15	4	3	1	0	0	102	23	4.43
Understanding of Social and Ethical Issues									
Outcome has been met for me personally	9	7	6	1	0	0	93	23	4.04
How meaningful the outcome is for me personally	10	6	6	1	0	0	94	23	4.09
Ability to Work Cooperatively in Teams									
Outcome has been met for me personally	8	7	6	1	0	1	88	23	3.83
How meaningful the outcome is for me personally	13	4	5	1	0	0	98	23	4.26
Demonstrate Effective Communication Skills									
Outcome has been met for me personally	10	5	7	1	0	0	93	23	4.04
How meaningful the outcome is for me personally	13	8	1	1	0	0	102	23	4.43
Experience with Contemporary Environments and Tools									
Outcome has been met for me personally	10	6	7	0	0	0	95	23	4.13
How meaningful the outcome is for me personally	12	7	3	1	0	0	99	23	4.30

**APPENDIX D-2: Exit (Graduating Student) Survey**  
SUMMARY OF STATISTICAL RESULTS - SUMMER 2013 TO SPRING 2015

**TOTAL RESPONSES → 98**

PROGRAM EDUCATIONAL OBJECTIVE	TOTAL RESPONSES	FINAL SCORE (WEIGHTED)	PERCENTAGE
<b>A - Proficiency in Foundation Areas of Computer Science</b>			
Outcome has been met for me personally	98	4.39	87.76
How meaningful the outcome is for me personally	98	4.53	90.61
<b>B - Proficiency in Core Areas of Computer Science</b>			
Outcome has been met for me personally	98	4.46	89.18
How meaningful the outcome is for me personally	98	4.68	93.67
<b>C - Proficiency in Problem Solving</b>			
Outcome has been met for me personally	98	4.20	84.08
How meaningful the outcome is for me personally	98	4.59	91.84
<b>D - Proficiency in Programming Language</b>			
Outcome has been met for me personally	98	4.64	92.86
How meaningful the outcome is for me personally	98	4.76	95.10
<b>E - Understanding of Social and Ethical Issues</b>			
Outcome has been met for me personally	98	4.18	83.67
How meaningful the outcome is for me personally	98	4.26	85.10
<b>F - Ability to Work Cooperatively in Teams</b>			
Outcome has been met for me personally	98	4.28	85.51
How meaningful the outcome is for me personally	98	4.67	93.47
<b>G - Demonstrate Effective Communication Skills</b>			
Outcome has been met for me personally	98	4.36	87.14
How meaningful the outcome is for me personally	98	4.72	94.49
<b>H - Experience with Contemporary Environments and Tools</b>			
Outcome has been met for me personally	98	4.17	83.47
How meaningful the outcome is for me personally	98	4.66	93.27

AVERAGE RATING OF STUDENT OUTCOMES - 'A'  
TO 'H'

ATTAINMENT	4.34	86.71
RELEVANCE	4.61	92.19

AVERAGE RATING OF STUDENT OUTCOMES - 'A'  
TO 'E'

ATTAINMENT	4.38	87.51
RELEVANCE	4.56	91.27

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

The Alumni Survey data for this cycle was collected between May 2015 and October 2015. It is available at <https://www3.cis.fiu.edu/alumni/admin/> and is presented below along with statistical results.

ALUMNI SURVEY - STATISTICS											
			SCORES - # OF STUDENTS RESPONDING					TOTAL	NUMBER OF	AVERAGE	
PROGRAM EDUCATIONAL OBJECTIVE			Excellent	Good	Satisfactory	Poor	Unsatisfactory	WEIGHTED SCORE	RESPONSES	SCORE	PERCENTAGE
			4	3	2	1	0				
<b>EDUCATIONAL EXPERIENCE</b>											
Capacity for Personal growth			51	44	15	6	0	372	116	3.21	80.17
Capacity for Lifelong learning			49	52	12	4	0	380	117	3.25	81.20
Development of Communication Skills			35	42	33	4	1	336	115	2.92	73.04
Awareness of Social & Ethical Responsibility			38	45	25	5	1	342	114	3.00	75.00
Preparation for career in CS			40	47	21	9	0	352	117	3.01	75.21
Preparation for Graduate Study			35	44	28	6	3	334	116	2.88	71.98
<b>PREPARATION UPON GRADUATION</b>											
Quality of Preparation - Computer programming			42	44	18	8	1	344	113	3.04	76.11
Quality of Preparation - Systems Development			24	41	34	12	1	299	112	2.67	66.74
Quality of Preparation - Data Structures & Algo.			49	38	14	9	2	347	112	3.10	77.46
Quality of Preparation - Comp. Architecture & Org.			24	53	21	12	1	309	111	2.78	69.59
<b>FACULTY AND INSTRUCTION</b>											
Dedication of Faculty to UG Teaching			47	47	17	4	1	367	116	3.16	79.09
Expertise of Faculty in Subject Areas			51	45	13	2	2	367	113	3.25	81.19
Mentorship provided by Faculty			24	46	24	16	4	298	114	2.61	65.35
Overall Instructional Capability of Faculty			39	51	19	2	4	349	115	3.03	75.87
<b>DIVERSITY PROMOTION AND ENVIRONMENT</b>											



Effectiveness in maintaining diverse student body	58	31	12	6	3	355	110	3.23	80.68
Diversity as agent for personal growth	46	41	23	4	2	357	116	3.08	76.94
Diversity as agent for awareness of social concerns	36	43	24	4	4	325	111	2.93	73.20
Extent to which healthy learning env. is promoted	48	41	17	3	2	352	111	3.17	79.28
OVERALL RATING OF EDUCATIONAL EXPERIENCE	248	274	134	34	5	2116	695	3.04	76.12
OVERALL RATING OF PREPARATION UPON GRADUATION	139	176	87	41	5	1299	448	2.90	72.49
OVERALL RATING OF FACULTY & INSTRUCTION	161	189	73	24	11	1381	458	3.02	75.38
OVERALL RATING OF DIVERSITY PROMOTION & ENV.	188	156	76	17	11	1389	448	3.10	77.51
OVERALL SATISFACTION WITH BS-CS PROG. OBJECTIVES	736	795	370	116	32	6185	2049	3.02	75.46

**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



### APPENDIX E-3: Employer Survey Raw Data and Statistics

The Employer Survey data for this cycle was collected between May 2015 and December 2015. It is available at [https://www3.cis.fiu.edu/\\*\\*\\*\\*\\*/admin/](https://www3.cis.fiu.edu/*****/admin/) and is presented below along with statistical results.

TOTAL RESPONSES → 19

Question about our Graduates	EMPLOYER RESPONSES					Total	Weighted Score
	Excellent	Very Good	Good	Fair	Poor		
Response Score -->	4	3	2	1	0		Max. = 4
Mastery of CS concepts & ability to solve problems	6	4	4	1	0	15	3.00
Ability to Communicate Verbally	3	7	4	2	0	16	2.69
Ability to Communicate in Written Form	2	8	4	1	1	16	2.56
Ability to work cooperatively in a team	6	6	1	0	0	13	3.38
Understanding of Social and Ethical Concerns	1	9	3	0	0	13	2.85
Ability to learn Emerging Concepts and Technologies	5	6	3	0	0	14	3.14
Will you consider employing our graduates in future	Yes = 18	No = 0					
<b>OVERALL SCORE OF OUR GRADUATES</b>	<b>2.92</b>						

**APPENDIX F: Course-Embedded Assessment Summaries  
Fall 2013, Spring 2014, and Summer 2014**

DIRECT ASSESSMENT SUMMARY OF CS COURSES (SENIOR PROJECT EXCLUDED) - FALL 2013 - SPRING 2015						
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Fall 2013	COP 4610	Computer Systems	12	18	69.23	69.23
		Memory Management	11.5	4	15.38	84.62
			9.5	4	15.38	100.00
			TOTAL-->	26		
					75% cut-off -->	100
Fall 2013	COP 4610	Computer Systems	12	18	69.23	69.23
		Storage Management	11	6	23.08	92.31
			10	2	7.69	100.00
			TOTAL-->	26		
					75% cut-off --> (9)	100
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Fall 2013	MAD 2104	Foundations	16	1	3.57	3.57
		Discrete Structures and Logic	15	5	17.86	21.43
			14	1	3.57	25.00
			13	2	7.14	32.14
			12	8	28.57	60.71
			11	1	3.57	64.29
			9	5	17.86	82.14
			8	1	3.57	85.71
			7	2	7.14	92.86
			6	1	3.57	96.43
			2	1	3.57	100.00

				TOTAL-->	28		
					75% cut-off --> (12)	60.71	
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Fall 2013	MAD 3512	Foundations		20	1	3.45	3.45
		Theory of Algorithms		18	4	13.79	17.24
				16	7	24.14	41.38
				14	6	20.69	62.07
				12	10	34.48	96.55
				10	1	3.45	100.00
				TOTAL-->	29		
					75% cut-off --> (15)	41.38	
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Spring 2014	CEN 4010	Software Engineering		Score	# Students	%	Cumulative
		Implementation and Validation					
				10	10	41.67	41.67
				8	3	12.50	54.17
				7	3	12.50	66.67
				5	8	33.33	100.00
				TOTAL-->	24		
					75% cut-off --> (7.5)	54.17	
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Spring 2014	CGS 3095	Professional Development		4	48	78.69	78.69
		Social & Ethical Concerns		3	8	13.11	91.80
				2	4	6.56	98.36
				1	1	1.64	100.00

				0	0	0.00	100.00
				TOTAL ->	61		
						75% cut-off --> (3)	91.80
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Spring 2014	CGS 3095	Professional Development		4	49	80.33	80.33
		Communication Skills		3	11	18.03	98.36
				2	0	0.00	98.36
				1	0	0.00	98.36
				0	1	1.64	100.00
				TOTAL ->	61		
						75% cut-off --> (3)	98.36
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Spring 2014	CGS 3095	Professional Development		4	59	96.72	96.72
			Legal, ethical, and social impacts	3	1	1.64	98.36
			of technology as related to	2	0	0.00	98.36
			individual privacy, security, and	1	0	0.00	98.36
			anonymity in societies across	0	1	1.64	100.00
			the globe and in the global				
			internet society	TOTAL ->	61		
						75% cut-off --> (3)	98.36
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Spring 2014	CGS 3095	Professional Development		4	48	78.69	78.69
			Legal, ethical, and social impacts	3	8	13.11	91.80
			of technology as related to	2	4	6.56	98.36
			intellectual property rights, and	1	1	1.64	100.00
			how the global reach of the	0	0	0.00	100.00
			internet effects these issues				

			TOTAL ->	61		
				75% cut-off --> (3)	91.80	
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Spring 2014	CGS 3095	Professional Development	4	53	86.89	86.89
		Computing Professional's Roles	3	1	1.64	88.52
		and Responsibilities as related to	2	2	3.28	91.80
		intellectual property, privacy,	1	0	0.00	91.80
		anonymity, legal, social, and	0	5	8.20	100.00
		ethical issues				
			TOTAL ->	61		
				75% cut-off --> (3)	88.52	
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Spring 2014	CGS 3095	Professional Development	8	10	43.48	43.48
		Ethical and Social Issues	6	9	39.13	82.61
			4	4	17.39	100.00
			TOTAL-->	23		
				75% cut-off --> (6)	82.61	
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Spring 2014	COP 4338	Computer Systems	12	16	47.06	47.06
		Multi-Threading	10	4	11.76	58.82
			9	10	29.41	88.24
			8	2	5.88	94.12
			6	2	5.88	100.00
			TOTAL-->	34		
				75% cut-off --> (9)	88.24	



SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Spring 2014	COP 4555	Foundations	10	17	45.95	45.95
		Survey of Programming Languages	9	2	5.41	51.35
			8	3	8.11	59.46
			7	7	18.92	78.38
			6	2	5.41	83.78
			5	5	13.51	97.30
			4	1	2.70	100.00
			TOTAL-->	37		
					75% cut-off --> (7.5)	59.46
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Spring 2014	COP 4710	Computer Systems	11	3	14.29	14.29
		Database Management	10	1	4.76	19.05
			9	3	14.29	33.33
			8	3	14.29	47.62
			7	6	28.57	76.19
			6	1	4.76	80.95
			5	3	14.29	95.24
			4	1	4.76	100.00
			TOTAL-->	21		
					75% cut-off --> (8.25)	33.33
SEMESTER	COURSE	PROGRAM OBJECTIVE	Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION				
Summer 2014	COP 3530	Programming	17	3	12.00	12.00
		Data Structures & Analysis of Algo.	15	8	32.00	44.00
			14	4	16.00	60.00
			13.6	1	4.00	64.00
			13	3	12.00	76.00
			12	3	12.00	88.00
			10	2	8.00	96.00

				9	1	4.00	100.00
				Total -->	25		
						75% cut-off -> (12.75)	76.00
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Summer 2014	COP 3530	Programming		8	20	80.00	80.00
		Abstraction		7	3	12.00	92.00
				4	2	8.00	100.00
				TOTAL-->	25		
						75% cut-off -> (6)	92.00
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Summer 2014	COP 3530	Programming		16	12	48.00	48.00
		Use of Java API		15	6	24.00	72.00
				14	4	16.00	88.00
				13	1	4.00	92.00
				11	1	4.00	96.00
				10	1	4.00	100.00
				TOTAL-->	25		
						75% cut-off -> (12)	92.00
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	%	Cumulative
	NUMBER	TOPIC DESCRIPTION					
Summer 2014	COP 3530	Programming		8	19	76.00	76.00
		Linked Structures		7	2	8.00	84.00
				4	1	4.00	88.00
				3	1	4.00	92.00
				0	2	8.00	100.00
				TOTAL-->	25		

				75% cut-off -> (6)	84.00	
SEMESTER	COURSE	PROGRAM OBJECTIVE		Score	# Students	% Cumulative
	NUMBER	TOPIC DESCRIPTION				
Summer 2014	COP 3530	Programming		8	23	92.00 92.00
		Recursion		0	2	8.00 100.00
				TOTAL-->	25	
				75% cut-off -> (6)	92.00	

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

\_\_\_\_\_

Number of team members: \_\_\_\_\_ Semester & Year

\_\_\_\_\_

Project origination:

\_\_\_\_\_

\_\_\_\_\_

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Evaluator

Affiliation

\_\_\_\_\_

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**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:*

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

## BS in CS Student Outcomes Assessment via Senior Project

Student Outcomes	Rating
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems	
c) Demonstrate proficiency in problem solving and application of software engineering techniques	
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	
g) Demonstrate effective communication skills.	
h) Have experience with contemporary environments and tools necessary for the practice of computing.	

Rubric (Spring 2011)

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

Project Title \_\_\_\_\_

Semester & Year \_\_\_\_\_

Moderator (Faculty / Industry Sponsor): \_\_\_\_\_

Evaluators: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Student Outcome (a): Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms**

\_\_\_\_\_ Project incorporates elements of mathematical reasoning or proof  
(Lemma, Theorem, Propositional Logic, First Order Logic, Mathematical Induction)

\_\_\_\_\_ Project utilizes elements of discrete mathematics  
(Set Theory, Boolean Algebras, Combinatorics, Graph Theory)

\_\_\_\_\_ Project utilizes some statistical procedure(s) to represent or summarize test data  
(Mean, Standard Deviation, Stem Plot/Histogram, Box Plot/Percentile-Graph)

\_\_\_\_\_ Project utilizes some statistical measure(s) of system behavior or performance  
(Probability Distributions, Confidence Intervals, Hypothesis Testing)

\_\_\_\_\_ Project design utilizes finite state diagrams to model system behavior

\_\_\_\_\_ Project utilizes some aspect(s) of formal computer science  
(Automata, Turing Machines, Recursive Function Theory, Recursive Unsolvability)

\_\_\_\_\_ Project utilizes some technique(s) of numerical analysis  
(Error Estimation, Interpolation, Numerical Calculus, Linear Systems, Matrix Algebra)

\_\_\_\_\_ OTHER:

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\_\_\_\_\_ OTHER:

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**Student Outcome (b): Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.**

**Data Structures & Algorithms**

\_\_\_\_\_ Project utilizes an advanced data structure, e.g. search tree, hash table, priority queue

\_\_\_\_\_ Project utilizes some graph algorithm, e.g. shortest path, minimum spanning tree

\_\_\_\_\_ Project documents runtime analysis of selected algorithms

**Concepts of Programming Languages**

\_\_\_\_\_ Project utilizes knowledge of programming language syntax



(Context-Free Grammars, Parse Trees, Ambiguity, Recursive Descent)

- \_\_\_ Project utilizes knowledge of programming language semantics  
(Natural Semantics, Interpreters, Expressions, L- and R- Value, Environments)
- \_\_\_ Project demonstrates familiarity with design issues such as scoping rules, dynamic type checking, static type checking

Computer Systems (Database)

- \_\_\_ Project utilizes or designs an appropriate database management system
- \_\_\_ Project utilizes conceptual and/or relational schema
- \_\_\_ Project utilizes a database query language such as SQL

Computer Systems (Operating Systems)

- \_\_\_ Project implementation utilizes knowledge of memory management
- \_\_\_ Project implementation utilizes knowledge of process synchronization
- \_\_\_ Project documents analysis of tradeoffs in selection of system characteristics

\_\_\_ OTHER:

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\_\_\_ OTHER:

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**Student Outcome (c): Demonstrate proficiency in problem solving and application of software engineering techniques.**

- \_\_\_ Project demonstrates knowledge of the Software Development Life Cycle
- \_\_\_ Project deliverables include Project Specification
- \_\_\_ Project deliverables include Feasibility Study and/or Project Plan
- \_\_\_ Project deliverables include Requirements Documentation
- \_\_\_ Project deliverables include Design Documentation
- \_\_\_ Project documents testing and/or evaluation of the implementation

\_\_\_\_ Project incorporates system walkthroughs

\_\_\_\_ OTHER:

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\_\_\_\_ OTHER:

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**Student Outcome (d): Demonstrate mastery of at least one modern programming language and proficiency in at least one other.**

- \_\_\_ Project is implemented using an appropriate high level language
- \_\_\_ Project implementation is reasonably efficient rather than “brute force”
- \_\_\_ Project implementation is modular and/or re-usable
- \_\_\_ Project implementation uses a modern API or Tool-Kit
- \_\_\_ Project implementation utilizes recursion
- \_\_\_ Project implementation utilizes some advanced features, e.g. polymorphism
- \_\_\_ A project sub-system or module utilizes an appropriate programming language other than the primary implementation language, e.g. SQL, ML, assembly language
- \_\_\_ OTHER:  
\_\_\_\_\_

\_\_\_ OTHER:  
\_\_\_\_\_

**Student Outcome (e): Demonstrate understanding of the social and ethical concerns of the practicing computer scientist**

- \_\_\_ Project documents sources and references
- \_\_\_ Project identifies and addresses any relevant social issues
- \_\_\_ Project identifies and addresses any relevant ethical issues
- \_\_\_ Project identifies and addresses relevant legal issues
- \_\_\_ Project identifies and addresses any relevant privacy issues
- \_\_\_ Project documents anticipated impact on users/clients
- \_\_\_ Project documents and addresses any anticipated technology impact issues
- \_\_\_ OTHER:  
\_\_\_\_\_

\_\_\_ OTHER:  
\_\_\_\_\_

**Student Outcome (f): Demonstrate the ability to work cooperatively in teams**

\_\_\_ Project completion evidences equitable participation by team members

\_\_\_ Project presentation(s) included all team members

\_\_\_ Project team activity is documented

\_\_\_ Project team set out and followed a schedule for timely completion

\_\_\_ Project team negotiated consensus when needed

\_\_\_ Team members roles were clearly defined and executed

\_\_\_ Team members shared responsibility for success and failure

\_\_\_ OTHER:

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\_\_\_ OTHER:

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**Program Outcome (g): Demonstrate effective communication skills**

\_\_\_ Presentations described the essential features of the project

\_\_\_ Presentations utilized good quality slides and presentation aids

\_\_\_ Presenters utilized their time effectively

\_\_\_ Presenters spoke directly to the audience

\_\_\_ Technical features were communicated clearly

\_\_\_ Project artifacts clearly document all project features

\_\_\_ Project reports are well organized and written

\_\_\_ OTHER:

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\_\_\_ OTHER:

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**Program Outcome (h):** *Have experience with contemporary environments and tools necessary for the practice of computing*

- \_\_\_ Project utilized contemporary design tools
- \_\_\_ Project implementation utilized a modern IDE(s)
- \_\_\_ Project utilized appropriate validation/testing tools
- \_\_\_ Project was demonstrated using appropriate presentation tools
- \_\_\_ Project utilized appropriate project management tools (e.g., MS Project)
- \_\_\_ Project utilizes appropriate version control/document sharing tools
- \_\_\_ Project documents consideration of trade-offs in selection of tools

\_\_\_ OTHER:

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\_\_\_ OTHER:

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**ABET Student Outcome**

*The program must enable students to attain, by the time of graduation:*

*(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. [CS]*

Please comment on how this project “demonstrates comprehension of the tradeoffs involved in design choices”:

**APPENDIX G-2: Senior Project Assessment Results – Summer 2013**

	<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>
<b>Project 1</b>	3	3	5	4	3		5	
<b>SSC</b>	3	2.5	5	4	2	5	5	5
<b>Project 2</b>	2	2.25	5	5	2		5	
<b>PT</b>	2	2.25	5	5	2	5	5	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>
<b>Mean</b>	<b>2.5</b>	<b>2.5</b>	<b>5</b>	<b>4.5</b>	<b>2.25</b>	<b>5</b>	<b>5</b>	<b>5</b>

**APPENDIX G-3: Senior Project Assessment Results – Fall 2013**

	<u>Outcome</u> <b>(a)</b>	<u>Outcome</u> <b>(b)</b>	<u>Outcome</u> <b>(c)</b>	<u>Outcome</u> <b>(d)</b>	<u>Outcome</u> <b>(e)</b>	<u>Outcome</u> <b>(f)</b>	<u>Outcome</u> <b>(g)</b>	<u>Outcome</u> <b>(h)</b>
<b>Project 1</b>	3	3.25	5	3	3		5	
DP	3	3.75	5	5	4	5	5	5
<b>Project 2</b>	3	2.5	5	4	1		5	
GE	3	2.5	5	4	1	5	5	5
<b>Project 3</b>	3	3.25	5	4	3		5	
MCV2	3	3.75	5	4	3	5	5	5
<b>Project 4</b>	3	3	5	3	2		5	
MJV2	3	3.5	5	4	3	5	5	5
<b>Project 5</b>	3	3.5	5	3	4		5	
AI	3	4	5	5	5	5	5	5
<b>Project 6</b>	3	3.25	5	3	4		5	
SPWV2	3	3.75	5	5	5	5	5	5
<b>Project 7</b>	3	3.5	5	3	2		5	
VJF	3	4	5	5	3	5	5	5
<b>Project 8</b>	2	3.5	5	3	4		5	
EM	2	4	5	5	5	5	5	5
<b>Project 9</b>	2	2.5	5	3	2		5	
DV	2	2.5	5	3	2	5	5	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>(a)</u>	<u>(b)</u>	<u>(c)</u>	<u>(d)</u>	<u>(e)</u>	<u>(f)</u>	<u>(g)</u>	<u>(h)</u>
<b>Mean</b>	<b>2.78</b>	<b>3.33</b>	<b>5.00</b>	<b>3.83</b>	<b>3.11</b>	<b>5.00</b>	<b>5.00</b>	<b>5.00</b>



**APPENDIX G-4: Senior Project Assessment Results – Spring 2014**

	<u>Outcome</u> <b>(a)</b>	<u>Outcome</u> <b>(b)</b>	<u>Outcome</u> <b>(c)</b>	<u>Outcome</u> <b>(d)</b>	<u>Outcome</u> <b>(e)</b>	<u>Outcome</u> <b>(f)</b>	<u>Outcome</u> <b>(g)</b>	<u>Outcome</u> <b>(h)</b>
<b>Project 1</b>	3	3	5	4	5		5	
<b>AEC</b>	3	2.5	5	4	5	5	5	5
<b>Project 2</b>	1	3	5	4	2		5	
<b>CP</b>	1	2.75	5	4	1	5	5	5
<b>Project 3</b>	2	3.5	5	5	4		5	
<b>DVM</b>	2	3.75	5	5	4	5	5	5
<b>Project 4</b>	4	4.25	5	5	2		5	
<b>DLFA</b>	5	4	5	5	2	5	5	5
<b>Project 5</b>	3	1.75	5	2	3		5	
<b>HM</b>	3	1.75	5	3	3	5	5	5
<b>Project 6</b>	2	2.75	5	4	2		5	
<b>MOS</b>	2	3.5	5	4	3	5	5	5
<b>Project 7</b>	2	2.25	5	4	3		5	
<b>PG</b>	2	3	5	4	5	5	5	5
<b>Project 8</b>	3	2.5	5	3	2		5	
<b>PL</b>	3	2.75	5	3	2	5	5	5
<b>Project 9</b>	3	3.25	5	4	3		5	
<b>SPWV3</b>	3	4	5	5	4	5	5	5
<b>Project 10</b>	2	2.75	5	5	1		5	
<b>VHRM</b>	2	3.75	5	5	1	5	5	4

	<u>Outcome</u> <u>(a)</u>	<u>Outcome</u> <u>(b)</u>	<u>Outcome</u> <u>(c)</u>	<u>Outcome</u> <u>(d)</u>	<u>Outcome</u> <u>(e)</u>	<u>Outcome</u> <u>(f)</u>	<u>Outcome</u> <u>(g)</u>	<u>Outcome</u> <u>(h)</u>
Mean	2.55	3.0375	5	4.1	2.85	5	5	4.9

**APPENDIX G-5: Senior Project Assessment Results – Summer 2014**

	<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>
<b>Project 1</b>	3	3.5	5	5	2		5	
SPWV4	3	3.75	5	5	3	5	5	4
<b>Project 2</b>	4	3.25	5	5	1		5	
CPV2	4	3	5	5	1		5	
<b>Project 3</b>	4	3.25	5	4	2		5	
MJV3	4	3.5	5	5	3	5	5	5
<b>Project 4</b>	1	2.75	5	4	3		5	
VJFV3	1	2.5	5	4	3	5	5	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>
<b>Mean</b>	<b>3</b>	<b>3.1875</b>	<b>5</b>	<b>4.625</b>	<b>2.25</b>	<b>5</b>	<b>5</b>	<b>4.666667</b>

**APPENDIX G-6: Senior Project Assessment Results – Fall 2014**

	<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>
Project 1	1	3	5	3	5		5	
CMS_V2	1	3.75	5	4	4	5	5	5
Project 2	1	3.5	5	3	3		5	
CP_V3	1	3.5	5	4	3	5	5	5
Project 3	1	2.5	5	3	3		5	
HE	1	3.5	5	4	3	5	5	5
Project 4	1	2.75	5	3	2		5	
IIE	1	3.75	5	4	2	5	5	5
Project 5	2	3	5	3	3		5	
iOSGAME	2	3.25	5	4	2	5	5	5
Project 6	2	4.25	5	5	5		5	
JGFS	2	4.25	5	5	5	5	5	5
Project 7	1	3.5	5	5	3		5	
PM	1	4.25	5	5	3	5	5	5
Project 8	1	4	5	4	3		5	
SW	1	4.5	5	5	3	5	5	5
Project 9	2	3.5	5	4	4		5	
SES	2	4	5	5	4	5	5	4
Project 10	1	2	5	3	2		5	
VJF_V4	1	2.5	5	3	2	5	5	5
Project 11	1	3.25	5	3	4		5	
VQ	1	4.25	5	4	3	5	5	5
Project 12	2	3.75	5	3	4		5	
VW4A	2	3.75	5	4	4	5	5	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>

Mean	1.33	3.51	5.00	3.88	3.29	5.00	5.00	4.92
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**APPENDIX G-7: Senior Project Assessment Results – Spring 2015**

	<u>Outcome</u> <u>(a)</u>	<u>Outcome</u> <u>(b)</u>	<u>Outcome</u> <u>(c)</u>	<u>Outcome</u> <u>(d)</u>	<u>Outcome</u> <u>(e)</u>	<u>Outcome</u> <u>(f)</u>	<u>Outcome</u> <u>(g)</u>	<u>Outcome</u> <u>(h)</u>
<b>Project 1</b>	1	3	5	3	4		5	
BOLO-FC	1	3.75	5	4	3	5	5	5
<b>Project 2</b>	1	4	5	3	4		5	
CP_V5	1	3.5	5	4	4	5	5	5
<b>Project 3</b>	1	2.5	5	3	4		5	
DDD_V1	1	3.75	5	4	4	5	5	5
<b>Project 4</b>	1	2.75	5	3	3		5	
AEDCC_V2	1	3.75	5	4	3	5	5	5
<b>Project 5</b>	1	3	5	3	3		5	
iBLESS_V1	1	3.25	5	4	2	5	5	5
<b>Project 6</b>	2	4.25	5	5	4		5	
MCC_V2	2	4.25	5	5	5	5	5	5
<b>Project 7</b>	2	4.25	5	5	4		5	
MJ_V5	2	4	5	5	5	5	5	5
<b>Project 8</b>	1	2.5	5	5	2		5	
MTMAF_V1	1	3.25	5	5	4	5	5	5
<b>Project 9</b>	1	3.25	5	5	3		5	
MOS_V2	1	4	5	5	3	5	5	5
<b>Project 10</b>	1	2.75	5	4	3		5	
SIL_V1	1	4.25	5	5	4	5	5	5
<b>Project 11</b>	1	3.75	5	4	4		5	
SPWS_V5	2	4	5	5	4	5	5	5
<b>Project 12</b>	1	4	5	4	4		5	
SCB_V1	1	4.5	5	5	5	5	5	5

Project 13	2	4.5	5	4	4		5	
SSOBEC_V1	2	4.75	5	5	5	5	5	5
Project 14	1	3.25	5	3	4		5	
SW_V2	1	4.25	5	4	3	5	5	5
Project 15	2	3.75	5	3	4		5	
TCAMS_V2	2	3.75	5	4	4	5	5	5
Project 16	2	3.25	5	3	4		5	
VJF_V5	2	4.25	5	4	4	5	5	5
Project 17	1	3.25	5	3	3		5	
VQ_V2	1	3.75	5	4	3	5	5	5
	<u>Outcome</u> <u>(a)</u>	<u>Outcome</u> <u>(b)</u>	<u>Outcome</u> <u>(c)</u>	<u>Outcome</u> <u>(d)</u>	<u>Outcome</u> <u>(e)</u>	<u>Outcome</u> <u>(f)</u>	<u>Outcome</u> <u>(g)</u>	<u>Outcome</u> <u>(h)</u>
Mean	<b>1.32</b>	<b>3.68</b>	<b>5.00</b>	<b>4.09</b>	<b>3.71</b>	<b>5.00</b>	<b>5.00</b>	<b>5.00</b>

**APPENDIX G-8: Senior Project Assessment Results Summary – Summer 2013-Spring 2015**

<b>Student Outcomes in CIS 4911 --- 2013-2015 Cycle</b>								
<b>Mean Outcome Results</b>								
	<b># Projects</b>	<b>Outcome (a)</b>	<b>Outcome (b)</b>	<b>Outcome (c)</b>	<b>Outcome (d)</b>	<b>Outcome (e)</b>	<b>Outcome (f)</b>	<b>Outcome (g)</b>
<b>Summer 2013</b>	2	2.50	2.50	5.00	4.50	2.25	5.00	5.00
<b>Fall 2013</b>	10	2.78	3.33	5.00	3.83	3.11	5.00	5.00
<b>Spring 2014</b>	10	2.55	3.04	5.00	4.10	2.85	5.00	5.00
<b>Summer 2014</b>	4	3.00	3.19	5.00	4.63	2.25	5.00	5.00
<b>Fall 2014</b>	12	1.33	3.51	5.00	3.88	3.29	5.00	5.00
<b>Spring 2015</b>	17	1.32	3.68	5.00	4.09	3.71	5.00	5.00
<b>Final Scores</b>	55	1.98	3.38	5.00	4.05	3.19	5.00	5.00

## **APPENDIX H: Student Organization Reports**

### **ACM Club Activities, 2012-2015**

(Summer 2013 to Spring 2015)

#### ***Summer 2013***

Workshop, June 11, 2013. Taking Laptops Apart. Number in Attendance: 10

Abstract: Workshop to teach students the various components inside laptops

Officers meeting, Aug 26, 2013.

#### ***Fall 2013***

General membership meeting, Sept 6, 2013

Workshop, Nov 26, 2013. Taking Laptops Apart. Workshop to teach students the various components inside laptops.

Student Appreciation Banquet, Dec 2, 2013. Attended by 25 members.

General meetings: 2

#### ***Spring 2014***

General meetings: 2

Jan 23 – SCIS Club/Organizations day, organized by Daniela Cadena

April 18 2014: Student Appreciation Banquet.

#### ***Summer 2014***

(no activities)

#### ***Fall 2014***

Workshop, Sept 5, 2014: Introduction to Hadoop. Introduced students into the HDFS ecosystem, common terminology, Hive, Sqoop, Pig, and Sqoop.

Workshop, Sept 11, 2014: Introduction to Machine Learning. Abstract: Introduction to ML, what it is, history, applications, WHY YOU SHOULD LEARN about it, and it will introduce you to some of the tools, libraries and languages used by Google, Facebook, Microsoft, and Amazon.

Membership Picnic, Crandon Park

#### ***Spring 2015***

General meeting Jan 27

General meeting Feb 24



## Activities of WICS Student Chapter from Summer 2013 to Spring 2015

- A. Summer 2013
  - a. Java Tutoring Session
  - b. Intel info session
  - c. Beach BBQ w ACM
- B. Fall 2013
  - a. Movie night
  - b. Java 2 tutoring session in collaboration with SCIS student orgs
  - c. Java 1 tutoring session in collaboration with SCIS student orgs
  - d. C++ workshop
  - e. JavaScript/JQuery Workshop
  - f. Soldering workshop @ Miami mini maker faire
  - g. Women in Industry Panel w/ SWE
- C. Spring 2014
  - a. ASUS Scavenger hunt
  - a. Soldering Workshop
  - b. How to create a programming language in collaboration with PLUG
  - c. Movie Night
- D. Summer 2014
  - a. Beach BBQ w/ ACM
- E. Fall 2014
  - a. Soldering Workshop @ Miami Mini Maker Faire (won SCIS award)
  - b. Soldering workshop @ FIU
  - c. De-Stress Event
  - d. GeekiWood - Unmasking Uncanny Valley
  - e. Hilton Software info session
- F. Spring 2015
  - a. Resume Workshop
  - b. Cinderella screening
  - c. Lunch with IBM Watson
  - d. Intel information session
  - e. State Farm info session

# Upsilon Pi Epsilon Report

## Summer 2013 to Spring 2015

Upsilon Pi Epsilon (UPE) is the international honor society for students in computer science, information technology, computer engineering, and management information systems. During the past two years the Florida International University (FIU) UPE honors society continued to engage students in activities such as workshops, social events, and collaborative projects with other student organizations in the School of Computing and Information Sciences (SCIS).

UPE continues to coordinate the SCIS town hall meeting (Spring 2014 and Spring 2015) where students meet the Director, Associate Director and faculty of SCIS. During the meeting the Directors present the vision of the school, inform students of any changes to the degree programs, and more importantly, are available to answer any questions the students may have pertaining to the school. The town hall meeting is held annually and is a collaborative effort with the other student organizations in SCIS including ACM@FIU, PLUG, STARS, and WICS. Other activities included hosting several workshops, for example, a web development workshop was held in the Spring of 2015, which focused on teaching students how to build their first website. Through the workshop, students learned to use languages such as HTML5 and CSS in order to make their web pages more attractive.

The membership in UPE continues to grow as shown by the two induction ceremonies held in April 2014 and November 2014 each with 10 and 12 inductees, respectively. The main challenge continues to be space for the organization to store its materials and for the UPE student leaders to use. We expect that SCIS will provide office space in the near future to UPE for use by its members, and if this is not feasible a shared space for use by the SCIS student organizations.

Peter Clarke

UPE Faculty Advisor

## STARS Activities Report

**Summer 2013** – STARS is relatively inactive in the summer terms, although there are some tutors who continue to volunteer during the summer. Five STARS students attended the STARS National convention in Atlanta.

### Fall 2013

Midterm Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Final Exam Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Tutoring services: STARS volunteer tutors meet individually with students to tutor them in a wide variety of courses from the CS, IT and CE majors, including some Math and Physics courses. STARS averages 150-200 volunteer tutoring hours per semester.

Student orientation sessions: STARS participated in freshman and transfer student orientation sessions for incoming new majors.

Outreach to Wesley Matthews Elementary School with a Robotics program.

<http://fiusm.com/2013/10/08/fiu-aims-high-with-the-stars-alliance/>

### Spring 2014

Midterm Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Final Exam Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Tutoring services: STARS volunteer tutors meet individually with students to tutor them in a wide variety of courses from the CS, IT and CE majors, including some Math and Physics courses. STARS averages 150-200 volunteer tutoring hours per semester.

Student orientation sessions: STARS participated in freshman and transfer student orientation sessions for incoming new majors.

Outreach: Participated in the FIU Engineering Expo for middle school students at College of Engineering. (photos available)

**Summer 2014** – STARS is relatively inactive in the summer terms, although there are some tutors who continue to volunteer during the summer. Six STARS students attended the STARS National Convention in Washington DC.

### Fall 2014:

Midterm Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Final Exam Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Tutoring services: STARS volunteer tutors meet individually with students to tutor them in a wide variety of courses from the CS, IT and CE majors, including some Math and Physics courses. STARS averages 150-200 volunteer tutoring hours per semester.

Tailgate party: STARS hosted a tailgate party before one of FIU's home football games.

## **Spring 2015**

Google RISE UP 4 CS outreach project: We collaborated with Georgia Tech on their Google grant to offer online webinars and on-campus sessions for high school students from unrepresented minority groups who were taking the AP CS 1 course and exam. Twice weekly online live webinars and once monthly on-campus meetings were held with the high school students during the entire semester.

Midterm Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Final Exam Review Sessions: Held on campus for courses COP 2210, COP 2250, COP 3804, COP 3337, COP 4703, and CGS 2518, conducted by STARS volunteer tutors.

Tutoring services: STARS volunteer tutors meet individually with students to tutor them in a wide variety of courses from the CS, IT and CE majors, including some Math and Physics courses. STARS averages 150-200 volunteer tutoring hours per semester.

Student orientation sessions: STARS participated in freshman and transfer student orientation sessions for incoming new majors.

Panther Rift: STARS hosted an online gaming event for a popular Xbox console game. Over 50 attendees participated in the competition.

## **FIU Panther Linux User Group (PLUG)**

### Summer 2013 – Spring 2015 Activities:

Open Source Project Meeting on 5/10/13 at 3pm in ECS-280

Workshop on “JavaScript and Node.js” on 5/24/13 at 3pm in ECS-212

General Meeting on 9/3/13 at 3:30pm in ECS-243

Linux Install Fest on 9/4/13 at 1pm in ECS-243

General Meeting on 9/10/13 at 3:30pm in ECS-235

General Meeting on 9/10/13 at 3:30pm in ECS-235

Workshop on Python Scripting on 11/5/13 at 3:30pm in ECS-235

General Meeting on 11/19/13 at 3:30pm in ECS-235

General Meeting on 12/3/13 at 3:30pm in ECS-235  
with presentations on various topics related to Linux and Technology

Linux Install Fest on 1/15/14 at 1pm in ECS-243

General Meeting on 1/28/14 at 3:30pm in ECS-243

General Meeting on 2/13/14 at 3:30pm in ECS-243

General Meeting on 2/27/14 at 3:30pm in ECS-243  
Presentations on Git source control to manage programming projects

General Meeting on 3/13/14 at 3:30pm in ECS-243  
Presentations on LaTeX, a markup language for creating professional looking documents

Linux Install Fest on 2/3/15 at 2-4pm in ECS-243

# FIU Programming Team Activities

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Summer 2013 through Spring 2015.

## **Summer 2013**

- Computational Thinking workshop for high school STEM Teachers, June 2013.

## **Fall 2013**

- Sent 3 teams (3 students each) to the ACM Southeast Regional Programming competition, Nov. 2013.
- One Saturday morning workshop for talented high school students, focused on problem solving and programming.

## **Spring 2014**

- FIU High School Programming Competition in April 2014 for 60 high school students.
- Three Saturday morning workshops for talented high school students, focused on problem solving and programming.

## **Summer 2014**

- Five-day Computer Science Principles Training workshop for high school STEM teachers, June 2014.

## **Fall 2014**

- Five Saturday morning workshops for talented high school students, focused on problem solving and programming.
- Sent three student teams to the ACM Southeast Regional Programming competition, Nov. 2014.
- MIT App Inventor training workshop for High School Teachers, Oct 2014

## **Spring 2015**

- FIU High School Programming Competition in April 2015 for 90 high school students.
- Four Saturday morning workshops for talented high school students, focused on problem solving and programming.

## **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)**

**April 26<sup>th</sup>, 2013**

**Florida International University**

**Miami, FL**

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**Board Member Attendance:**

- Pete Martinez, Board Chair, Senior Vice President for Technology Development and Board Chairman, Palm Beach Medical College
- Dr. Roy Gerber, Board Co-Chair, Managing Partner, L3W
- Jaime Borrás, CEO, Wireless Silicon Group and Senior Fellow at Motorola Mobile Devices
- Dr. Khaled El-Maleh, Principal Engineer/Manager, Multimedia & User Experience Engineering, Qualcomm
- Christopher Fleck, V.P., Platform Development, Citrix
- Jose Machado, Director of IT Software Engineering, Royal Caribbean Cruises Ltd.
- John Nygard III, CIO, Lennar Corp.
- Thomas Packert, VP of Information Management, Orthosensor

**FIU Representation:**

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Linnell Bickford, Development Officer, FIU CEC
- Steven Luis, Director of Technology and Business Relations, FIU SCIS
- Dr. Nagarajan Prabakar, Associate Professor, FIU SCIS
- Dr. Shaolei Ren, Assistant Professor, FIU SCIS
- Dr. Naphtali Rishe, Professor, FIU SCIS

## 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. Board members continue to pursue potential Board member prospects.

## Board Meeting Summary

1. Mr. Martinez opens the meeting at 5:10pm.
2. Mr. Martinez begins by making his opening remarks. He thanks members for taking the time to attend the meeting on a Friday Evening. He acknowledges many of the School's achievements over the past years. He expresses interest on behalf of the Board to get more involved by mentoring faculty and students on entrepreneurial projects.
  - a. Dr. Iyengar introduces Dr. Khaled El-Maleh as our new Board Member. He thanks El-Maleh for participating in our Board and expresses his interest to work with him to build a mutually beneficial collaboration with our faculty.
  - b. Board Members introduce themselves.
  - c. Addendums to the minutes are accepted.
3. Dr. Iyengar presents his Report to the Board (See materials per below).
4. Dr. Rishe provides an update on NSF AIR and Industry Consortium activities.
5. Student Senior Project presentations are made by:
  - a. Michael Montaque presents Mobile Clinic
  - b. Gregory Jean-Baptise presents Vmoodle Social
  - c. Jesse Domack presents Shout
  - d. Mr. Martinez remarked that he would like to see an Industry mentor for each project.
  - e. Mr. Packard remarking about the use of industry standard technology by students that "all the technologies used I am familiar with. It is good to see."
6. Dr. Ren gives his presentation on Green Computing related topics.
7. Discovery Lab students present the Telebot Project Update.
  - a. Mr. Martinez states that the team should get medical students involved to better understand how the human body moves.
8. Mr. Martinez asks Board members to provide their assessment and feedback.
  - a. Mr. Martinez starts by commending the Discovery Lab for creating a project that has long term vision and provides a living lab for collaborations with different disciplines.
  - b. Dr. El-Maleh comments on the skill sets needed to conduct such student projects including communication skills, leadership, and teamwork. He is impressed with the quality of the students and the focus of the projects presented.
  - c. Mr. Machado agrees with Dr. El-Maleh's comments. He too is impressed with the work. He especially like the collaboration and the thinking-outside-of-the-box of



- the projects. Overall, he rates the projects totally outstanding. He acknowledges RCCL interest in recruiting FIU students and working on increasing our partnership with FIU. He congratulates the students.
- d. Mr. Packard remarks that he “loves the Telebot project”. He has not seen any like this from students in SFL before. The project exposes students to many real world problems and the tools to solve them.
  - e. Dr. Iyengar responds that the students have a passion for the project and work very late hours. They are very committed to seeing the project completed.
  - f. Mr. Fleck states that the technologies like cloud services, API development/REST, are skills (displayed by the student projects) that Citrix is looking for and are in high demand in the industry.
  - g. Dr. Gerber he expresses his enjoyment watching the work in progress. Especially the teamwork that is displayed in the projects.
  - h. Mr. Martinez reiterates his earlier remarks that the Industry Board should be engaged to mentor the student teams: Board members could spend a couple of hours with each team. He wants the students to see how industry would approach some of the projects.
  - i. Mr. Nygard congratulates the students and faculty on some exciting work and great progress.
9. The Board agrees on Sept. 13, 2013 as the date for the next Board meeting.
  10. Mr. Martinez makes his closing remarks thanking Board member, faculty and students.
  11. Mr. Martinez closes the meeting at 8:03pm.

### **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 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*

- 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.

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

**Board Meeting Actions and Summary (DRAFT)**

**September, 13<sup>th</sup>, 2013**

**Florida International University**

**Miami, FL**

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**Board Member Attendance:**

- Pete Martinez, Board Chair, Senior Vice President for Technology Development and Board Chairman, Palm Beach Medical College
- Dr. Roy Gerber, Board Co-Chair, Managing Partner, L3W
- Jaime Borrás, CEO, Wireless Silicon Group and Senior Fellow at Motorola Mobile Devices
- Dr. Khaled El-Maleh, Principal Engineer/Manager, Multimedia & User Experience Engineering, Qualcomm
- Christopher Fleck, Vice President, Platform Development, Citrix
- John Nygard III, CIO, Lennar Corp.
- Stephen Reid, Vice-President of Software Engineering, Ultimate Software
- Bert Silvestre, Vice President, North America Business Partners Systems and Technology Group, IBM

**FIU Representation:**

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Linnell Bickford, Development Officer, FIU CEC
- Dr. Leonardo Bobadilla, Assistant Professor, FIU SCIS
- Dr. Bogdan Carbunar, Assistant Professor, FIU SCIS
- Steven Luis, Director of Technology and Business Relations, FIU SCIS

## **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. Board members continue to pursue potential Board member prospects.
3. 9/13/13: Conduct an employment survey with Fall 2013 graduating seniors. Report findings of survey.
4. 9/13/13: Board supports the development of Cyber Security Program. The School shall provide updates on progress.
5. 9/13/13: Board members have offered to mentor students in Senior Project Class. Will offer projects to mentor for Spring 2014.
6. 9/13/13: Board members agree that any member who has not recently communicated with the school or does not have a means of contact should be thanked for their service and dismissed.

## **Board Meeting Summary**

1. Mr. Martinez opens the meeting at 5:10pm.
2. Mr. Martinez asks Board members and Guests to introduce themselves.
3. Mr. Martinez addresses the Board with his opening statements:
  - a. Mr. Martinez commends Dr. El-Maleh for his lecture to the School.
  - b. He comments that students need to focus on the potential entrepreneurial outcomes of their research, especially in the areas addressed by Dr. El-Maleh's talk.
  - c. He thanks Board members for their time this evening to engage with the School.
4. Dr. Iyengar addresses the Board to deliver his Report (see materials):
  - a. Dr. Iyengar welcomes Board members.
  - b. He spotlights the new faculty member attending Dr. Bobadilla.
  - c. Dr. Iyengar discusses school metrics including graduation, publications, funding, tech transfer and recognition awards.
    - i. Board members comment on graduation process and issues that may impede students from graduating on time.
    - ii. Board members ask about the patent disclosure process and discuss methods to increase the number of disclosures and the time it takes for patent process.
    - iii. Board members discuss Cyber Security Proposal and express strong support for the program to meet increasing need for such talent in Florida. Testimonials to be provided to Cyber Security Committee to include in Proposal.
    - iv. Board members discuss internship opportunities and employment of graduating seniors. Request that the School produce a survey to better understand hiring trends.

- v. Board members again discuss graduation rates and suggest more mentoring to assist students.
- 5. Dr. Carburnar presents his research highlights to the Board (see materials):
  - a. Board members comment on the appropriateness of his cyber security research to meet industry interest and need.
- 6. Mrs. Bickford presents information regarding the University Foundation Capital Campaign
  - a. Board members thanked Mrs. Bickford for her presentation and asked to be kept abreast of the progress of the campaign.
- 7. Industry Feedback:
  - a. Board members discuss approaches to marketing the school faculty research and industry related projects. Write articles in trade publications/blogs. Present at local and national industry meetings.
  - b. Board members discuss potential internship processes to have companies engage the school for internships.
  - c. Board members discuss ranking of school and the need to see metrics recorded so that they are assessed by publications like US News and World Report College Rankings.
  - d. Board members discuss how to emphasize the School's brand to attract talented students and new faculty.
- 8. Actions: Board members agree that any members who has not recently communicated with the school or does not have a means of contact should be thanked for their service and dismissed.
- 9. Calendaring: Board members agree to meet again on Dec. 13<sup>th</sup>, 2013
- 10. Mr. Martinez makes his closing remarks.
  - a. He states that the school has shown the Board remarkable accomplishments and that you can "see the value".
  - b. He states further "you can feel [the school] going to the next level".
  - c. He concludes that critical areas of development are "starting to gel".
- 11. Mr. Martinez adjourns the meeting at 7:52pm.

### **Summary of Closed/Tabled Actions**

- 21. 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.*
- 22. 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*

**23. 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*

**24. 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*

**25. 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*

**26. 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*

**27. 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*



- 28. 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.
- 29. 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
- 30. 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.*
- 31. 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*
- 32. 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*

- 33. 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*
- 34. 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**
- 35. 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**
- 36. 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**
- 37. 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**
- 38. 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**
- 39. 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**
- 40.** 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.**

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

**Board Meeting Actions and Summary (DRAFT)**

**December, 13<sup>th</sup>, 2013**

**Florida International University**

**Miami, FL**

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**Board Member Attendance:**

- Dr. Roy Gerber, Board Co-Chair, Managing Partner, L3W
- Ruben Bravo, Managing Partner Kennetropy, LLC
- Dr. Khaled El-Maleh, Principal Engineer/Manager, Multimedia & User Experience Engineering, Qualcomm
- Christopher Fleck, Vice President, Platform Development, Citrix
- Jose Machado, Director of IT Software Engineering, Royal Caribbean Cruises Ltd.
- John Nygard III, CIO, Lennar Corp.
- Thomas Packert, VP of Information Management, Orthosensor
- Stephen Reid, Vice-President of Software Engineering, Ultimate Software
- Max Schmidt, IT Infrastructure, Operations and Information Security, Royal Caribbean Cruises Ltd.

**FIU Representation:**

- Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS
- Dr. Jinpeng Wei, Asst. Professor, FIU SCIS
- Dr. Jong-Hoon Kim, Director, Discovery Lab, FIU SCIS
- Linnell Bickford, Development Officer, FIU CEC
- Steven Luis, Director of Technology and Business Relations, FIU SCIS
- Greg Delsesto, FIU College of Business Administration

## **Summary of Board Actions**

7. 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. Board members continue to pursue potential Board member prospects.
8. 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey.

## **Board Meeting Summary**

1. Dr. Gerber opens the meeting at 5:09pm.
2. Dr. Gerber leads the Board members and Guest in introductions.
3. Dr. Iyengar presents his report to the Board. (See materials for details)
  - a. Dr. Iyengar states his vision to raise the school to be one of the top 50 programs in the nation.
  - b. He discusses how the School's faculty are receiving record level external funding and publishing in prestigious journals.
  - c. He reviews the faculty and student awards recent achieved.
  - d. Dr. Iyengar updates the Board regarding the proposed Master's in Cyber Security Degree Program
  - e. Dr. Iyengar informs the Board that Telebot program at the Discovery Lab will be covered by the Discovery Channel in Spring. He points out how the project has significantly raised the visibility of the school nationally and internationally. Students continue to be interested in the projects offered by the Discovery Lab.
  - f. Dr. Iyengar discusses several educational metrics demonstrating the growth of the undergraduate program and the PhD program.
  - g. Dr. Gerber thanks Dr. Iyengar for his report. Many Board members comment on the growth of the program.
4. Dr. Jinpeng Wei presents the Masters in Cyber Security (See materials for details)
  - a. Dr. Wei presents an overview of the program.
  - b. He discusses the basic philosophy and approach the faculty took to develop the courses and tracks.
  - c. He states that the proposal is with the Provost and we are awaiting approval from the State Legislature. The start date expected is Fall 2015.
  - d. Dr. Gerber commented on the value of certification in the area of cyber security.
  - e. Mr. Packert comments that each student should take a digital security ethics class.
5. Dr. Kim presents an update on the Discovery Lab and the Telebot Project (see materials).
6. Computer Science Senior Students present two projects showcasing their work.
7. Dr. Gerber asks Board members to provide their comments and feedback.
  - a. Mr. Machado points out that students are learning technologies which are very important in the industry. He cites the work students are doing with Hadoop to analyze Big Data problems is critical for their success in their future careers.

- b. Both Dr. Gerber and Mr. Schmidt comment on the importance of tying the Masters in Cyber Security program to certifications in the field. Certifications will give the program more prestige and help companies see the value of graduates from the program.
  - c. Mr. Packert discusses how he is seeing student develop skills they need such as mobile and cloud technologies. He is very impressed by the high caliber of the students.
  - d. Mr. Bravo commented on how much the program has grown and that the work done so far is amazing. In the area of cloud we have shown excellent growth.
  - e. Mr. Fleck also agreed with the real progress the school has made. He was very impressed with the projects both the ones presented at the meeting and the ones shown at the Student Showcase earlier in the day. He emphasized the importance to get the word out on what is going on in the school. This is important to change the perception of the region and the talent that is being developed in South Florida.
  - f. Mr. Reid commented that the Cyber Security profession is huge and in demand in South Florida. He feels strongly about the need for the MS program the school has proposed. He also commented that the School has become an amazing place for undergraduate talent.
  - g. Dr. Gerber commented that the student quality continues to go up as well as the relevance of the School. He comments he would like to see more continuity with the projects—look for ways allow projects to integrate from semester to semester.
8. Mr. Luis discusses dates for the next Board meeting. Board members agree to meet again on April 25<sup>th</sup>, 2014.
  9. Mr. Gerber adjourns the meeting at 8:15pm.

### **Summary of Closed/Tabled Actions**

- 41. 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.*
- 42. 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*

**43. 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*

**44. 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*

**45. 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*

**46. 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.
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# INDUSTRY ADVISORY BOARD

Florida International University

School of Computing and Information Sciences Board Meeting

Actions and Summary (DRAFT) April 25<sup>th</sup>, 2014

Florida International University Miami, FL

## Board Member Attendance:

- a) *Pete Martinez, IAB Chair, Sr. Vice President for Technology and Board Chairman, Palm Beach Medical College*
- b) *Dr. Roy Gerber, IAB Co-Chair, Managing Partner, L3W*
- c) *Jaime Borrás, CEO, Wireless Silicon Group, and Senior Fellow, Motorola Mobile Devices*
- d) *Ruben Bravo, Managing Partner Kennetropy, LLC*
- e) *Dr. Khaled El-Maleh, Principal Engineer/Manager, Multimedia & User Experience Engineering, Qualcomm*
- f) *Christopher Fleck, Vice President, Platform Development, Citrix*
- g) *Jose Machado, Director of IT Software Engineering, Royal Caribbean Cruises Ltd.*
- h) *John Nygard III, CIO, Lennar Corp.*
- i) *Thomas Packert, VP of Information Management, Orthosensor*
- j) *Bert Silvestre, Vice President, IBM*

## Board Guest:

- k) *Dr. Chen-Yu Phillip Sheu, Professor, Electrical Engineering and Computer Science, University of California, Irvine*

## FIU Representation:

- l) *Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS*
- m) *Dr. Christine Lisetti, Assoc. Professor, FIU SCIS*
- n) *Dr. Nagarajan Prabakar, Assoc. Professor, FIU SCIS*
- o) *Dr. Jong-Hoon Kim, Director, Discovery Lab, FIU SCIS*
- p) *Linnell Bickford, Development Officer, FIU CEC*
- q) *Steven Luis, Director of Technology and Business Relations, FIU SCIS*

## 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. Board members continue to pursue potential Board member prospects.*

*2. 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey.*

## **Board Meeting Summary**

- 1. Mr. Martinez opens the meeting at 5:16pm.*
- 2. Mr. Martinez thanks Board members for their attendance and stresses the importance of industry feedback for the School and the University at large.*
- 3. Dr. Iyengar presents the School Report to the Board (see materials)*
  - a. Dr. Iyengar reviews performance metrics of the school including new awards, research funding, and new hires*
  - b. He provides an update on the IT Performance Awards.*
  - c. Dr. Iyengar discusses Telebot and the worldwide attention it has generated.*
  - d. Mr. Martinez suggests finding a sponsor for the robot to expand its capabilities and marketing reach.*
  - e. Dr. Iyengar discusses the School's outreach activities within the community and School systems.*
  - f. He gives Board members a list of upcoming events including Dr. Micali's upcoming Lecture in Fall.*
- 4. Mrs. Bickford presents an overview of the upcoming College of Engineering and Computing 30 year anniversary.*
- 5. Dr. Lissetti presents an overview of her research activities in Affective Computing.*
- 6. Senior Project Presentations: Two senior project presentations are presented to Board members.*
- 7. Dr. Sheu presents the NSF I/UCRC he and other partner universities are developing in the area of Semantic Computing.*
- 8. Industry feedback:*
  - a. Dr. Gerber comments that Dr. Lissetti's work is very important and relevant to where industry is going. He commends the Sr. Project class and the improvement in the quality of work and the grasp of technology.*
  - b. Mr. Martinez suggests developing a business model to grow the School's robotics capabilities, from branding to merchandising. He comments that the school should seek out projects with social impact and consumer relevance—such projects will take time to develop.*
  - c. Mr. Silvestre states that he is impressed with the potential and the breadth of projects he has seen. He stated that having students develop project involving virtual machine technology would help them get ahead in their careers. Also, students are presenting in a very professional manner and*

*are improving in giving their pitches. Regarding Lisetti's work he feels the industry is looking for an interface similar to what she is developing. Her project would be excellent to connect with IBM Watson.*

- d. Mr. Fleck stated that the student projects are immediately useful for companies. He comments that there has been remarkable progress in the programs presented. In particular, he felt that Telebot needs more exposure and is a great story.*
- e. Mr. Packert was very impressed with the growth of the program. He stated that numerous problems in healthcare and that developing projects to address pressing issues such as data security are very relevant for industry.*
- f. Mr. Borrás congratulated all the presenters on their projects and congratulated the school for the many awards and accomplishments. He commented that the students are developing excellent mobile applications that are very relevant for industry and consumers.*
- 9. Mr. Luis proposes and the Board adopts a new Board meeting schedule from three meetings a year to two, coinciding with the Senior Project presentations in Dec. and April. The Board members agree to meet again on Dec. 12<sup>th</sup>.*
- 10. Mr. Martínez makes his closing remarks. He states that there are opportunities to outsource technology development to Academic institutions. To make this work, he states that the technology transfer offices will need to drop outdated processes and explore ways to partner with industry. Further he states that the university should consider creating an industry day to promote different verticals such as medical devices.*
- 11. Mr. Martínez closes the meeting at 7:45pm*

## **Summary of Closed/Tabled Actions**

- a. 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.*
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*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*

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*Board Action: 12/09/05 Closed*

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- **The school will implement these procedures at upcoming meetings.**

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*Board Action: 12/09/05 Closed*

- g. 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.*

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- i. 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*
- j. 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.*
- k. 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*
- l. 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**

- 1) **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**
- 2) **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**
  1. **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**
  2. **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**
  3. **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**
  4. **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**
  5. **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**

*6. 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.*

# INDUSTRY ADVISORY BOARD

Florida International University

School of Computing and Information Sciences Board Meeting

Actions and Summary (DRAFT) December 12<sup>th</sup> , 2014

Florida International University  
Miami, FL

## Board Member Attendance:

- r) *Pete Martinez, IAB Chair, Sr. Vice President for Technology and Board Chairman, Palm Beach Medical College*
- s) *Jaime Borrás, CEO, Wireless Silicon Group, and Senior Fellow, Motorola Mobile Devices*
- t) *Dr. Khaled El-Maleh, Principal Engineer/Manager, Multimedia & User Experience Engineering, Qualcomm*

## FIU Representation:

- u) *Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS*
- v) *Dr. Nagarajan Prabakar, Assoc. Professor, FIU SCIS*
- w) *Steven Luis, Director of Technology and Business Relations, FIU SCIS*

## 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. Board members continue to pursue potential Board member prospects.*

4. *9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey.*



## **Board Meeting Summary**

12. ***Mr. Martinez opens the meeting at 5:18pm.***
13. ***Mr. Martinez makes his opening remarks and comments on the industry relevant work that is happening at the School and especially with the Senior Project class.***
14. ***Dr. Iyengar presents his report to the Board. See materials.***
  - a. ***Dr. Iyengar states the importance to translate research work to industry application, and that the training of our students in this regard is of the most importance. Further that by focusing our efforts in this way we can achieve national recognition.***
  - b. ***Dr. Iyengar reviews the metrics of the school such as student headcount, eternal funding, and potential funding for the continuing academic year.***
  - c. ***Dr. Iyengar discusses several research/education projects engaged by faculty and students. He remarks on the passion of the students to work long hours to demonstrate their best work. Dr. Iyengar discusses the iCAVE project and how it will be used as an interdisciplinary teaching and research tool. Board members express interest in the project and ask to be informed when the instrument is ready for use.***
15. ***Selected students from the Senior Project Showcase demonstrated their projects to the Board. Board members provided feedback to the students and thanked them for their presentations.***
16. ***Dr. Ren was unable to give his presentation due to a commitment with the School's guest speaker and will be rescheduled to present in the future.***
17. ***Dr. Prabakar discusses the recommendations to change the undergraduate program objectives of both the CS & IT programs. He explained how proposed changes streamline objectives of both programs along ABET guidelines and merged into one list of program education objectives with justification. Attending Board members expressed their approval for the streamlines objectives.***
18. ***Board members express their feedback regarding meeting presentations***
  - a. ***Mr. Borrás commented on the level of improvement in the last four years. He is very impressed with the senior projects and how the areas of application they pursue. He commented on the number of projects and the level of engagement with industry.***
  - b. ***Mr. Martinez commented on the large research projects such as Telebot and the impact they have had on our School. Dr. Prabakar discusses the future road map of the project with Board members.***
  - c. ***Mr. Martinez comments how the School should work on creating more visibility for these projects and to become engaged in projects outside of the school such as the Student Scholarship Competition from the Association of Cuban Engineers.***
19. ***The Board members agreed to meet again on May 1<sup>st</sup>, 2015, the date of the next Senior Project Showcase.***
20. ***Mr. Martinez makes his closing remarks thanking Board members for attending.***
21. ***Mr. Martinez closes the meeting at 7:24pm***

## Summary of Closed/Tabled Actions

- m. 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.*
- n. 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*
- o. 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*

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*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*

- p. 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*

- q. **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*

- r. **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:**
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  - **It is sufficient for action to be taken on any agenda item by the attending Board members.**
  - **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.**
  - **The school will implement these procedures at upcoming meetings.**

*Board Action: 12/09/05 Closed*

- s. **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*

- t. **Business Continuity Information Network: 12/07: Mr Braun suggests to Board members to reach out to their peers and networks to facilitate support. Board**

**4**

**interested in sending letter of support on behalf of Centers of Excellence to lobby Gov. Board. Not pursued due to lobby rule limitations.**

- u. **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**

- v. **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.**
  
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**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**

4) **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**

7. **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**

8. **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**

9. **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**

10. **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**

11. **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**

12. **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.**

# INDUSTRY ADVISORY BOARD

Florida International University

School of Computing and Information Sciences Board Meeting

Actions and Summary (DRAFT) May 1<sup>st</sup>, 2015

Florida International University  
Miami, FL

## Board Member Attendance:

- x) *Dr. Roy Gerber, IAB Vice-Chair, Managing Member, L3W, LLC*
- y) *Jaime Borrás, CEO, Wireless Silicon Group, and Senior Fellow, Motorola Mobile Devices*
- z) *Christopher Fleck, Vice President of Community and Solutions Development*
- aa) *Thomas Packert, VP of Information Management, Orthosensor*
- bb) *Bert Silvestre, Vice President, North America Business Partners Systems and TEchnology Group, IBM Senior Location Executive IBM Corporation*

## FIU Representation:

- cc) *Dr. Ram Iyengar, Director and Ryder Professor, FIU SCIS*
- dd) *Dr. Naphtali Rishé, Director, FIU SCIS / HPDRC / NSF I/UCRC CAKE and Professor*
- ee) *Dr. Nagarajan Prabakar, Assoc. Professor, FIU SCIS*
- ff) *Steven Luis, Director of Technology and Business Relations, FIU SCIS*

## Summary of Board Actions

5. *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. Board members continue to pursue potential Board member prospects.*

6. 9/13/13: Conduct an employment survey with 2013-14 graduating seniors. Report findings of survey.

## **Board Meeting Summary**

22. Dr. Gerber opens the meeting at 5:15pm.

23. Dr. Gerber makes his opening remarks by commenting on the interesting Senior Projects he experienced earlier. He stated that he saw many industry relevant projects and that the quality has improved significantly. He encouraged Board members to evaluate these projects and give feedback to students.

a. Several Board members make similar comments on the quality of the student presentations. Board members give suggestions on how to improve the student's presentation pitches. Discussion concerning increasing the visibility of the Senior Project Showcase ensues.

24. Dr. Gerber recognizes Dr. Iyengar to present his Report to the Board. See materials for presentation details.

- a. Dr. Iyengar reviews the key metrics the School is monitoring for performance such as research output and student quality.
- b. He points out many recent awards faculty and students have accomplished.
- c. He describes several research activities of faculty members and outreach efforts.
- d. He speaks about the ongoing effort to develop Tech Station, the newest facility of the School.

25. Dr. Gerber recognizes Dr. Rishe who presents the Informed Traveler Program & Applications project. See Board materials for presentation slides.

a. Dr. Rishe gives an overview of the project, its goals, design and application. He discusses different use cases and compares the application

to other transportation assistant systems.

26. Dr. Gerber recognizes Dr. Prabakar who presents the Proposed Educational Objectives and Student Outcomes. See Board materials for the full proposal description.

2

a. Dr. Prabakar reviews the materials shared with the Board (at the previous meeting in Dec. 2014) about the proposed changes suggested by the SCIS Undergraduate Committee (UGC).

b. The UGC reviewed the existing undergraduate program objectives and outcomes of both CS & IT programs. UGC streamlined objectives of both programs along ABET guidelines and merged into one list of Program Educational Objectives with justification.

c. He thanked Board members for their feedback given at the last Board meeting. He encouraged Board members to express their questions.

d. After a brief discussion attending Board members expressed their approval of the proposal.

27. Dr. Gerber recognizes the Student Project Teams who present their work.

28. **Dr. Gerber encouraged Board members to express their feedback regarding the presentations given at the meeting.**
- a. **Mr. Packert expressed his interest in the the ITPA program and how important transportation solutions are in South Florida.**
  - b. **He expressed his excitement about the new facilities and emphasis on applied STEM projects.**
  - c. **Mr. Borrás discussion approaches to address drop out in the CS/IT program. Board members discuss High School preparation needed for students to be successful.**
  - d. **Dr. Iyengar discusses the current approaches used by advising staff and their interventions.**
  - e. **Mr. Borrás describes his experiences working as a Mentor of a Senior Project. He was very impressed by the preparation of the students, their style of work (using Agile), and how rigorous the effort is, and how committed the students are to completing the project.**
  - f. **Mr. Fleck expressed his approval of the continued progress the School is making. He expressed concern regarding the graduation rate and requested to be kept up to date on our efforts to address student graduation progress. He further commented on how students can improve their visibility to employers by contributing to Open Source and how such activities develops credibility in the community that students can use in seeking jobs.**
  - g. **Mr. Silvestre was very excited regarding the MS in Cybersecurity Program and explained how needed professionals in this area are in the State.**
  - h. **Dr. Iyengar invites Board members to the Inauguration of Tech Station to be held on Aug. 26<sup>th</sup>, 2015.**
  - i. **Dr. Gerber comments on the techniques used in the ITPA systems, and Dr. Rishe describes some approaches to address the challenges it is faced with.**
29. **Dr. Gerber recognizes Mr. Luis to assist the Board to select the next meeting date.**
- a. **The Board members agreed to meet again on Dec. 11<sup>th</sup>, 2015, the date of the next Senior Project Showcase.**
30. **Dr. Gerber makes his closing remarks thanking Board members for attending.**
31. **Dr. Gerber closes the meeting at 7:37pm**

3

## **Summary of Closed/Tabled Actions**

- y. **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.**



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*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*

*jj. 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**
- 5) **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**
- 6) **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**
13. **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**
14. **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**

15. *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**

16. *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**

17. *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**

18. 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.**

## 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

#### Sources:

CDA 3103 Syllabus: [http://www.cis.fiu.edu/programs/undergrad/courses/COP\\_3402.pdf](http://www.cis.fiu.edu/programs/undergrad/courses/COP_3402.pdf)

ACM CS 2008: <http://www.acm.org//education/curricula/ComputerScience2008.pdf>

## COP 4710 (COP 4540) 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

### Sources

COP 4710 (COP 4540) Syllabus: [http://www.cis.fiu.edu/programs/undergrad/courses/COP\\_4540.pdf](http://www.cis.fiu.edu/programs/undergrad/courses/COP_4540.pdf)  
ACM CS 2008: <http://www.acm.org//education/curricula/ComputerScience2008.pdf>