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Applied Science Accreditation Commission
Computing Accreditation Commission
Engineering Accreditation Commission
Engineering Technology Accreditation Commission

August 22, 2012

Paul R Latortue
Dean
University of Puerto Rico, Rio Piedras
College of Business Administration
Rio Piedras Campus, PO Box 23332
San Juan, PR 00931-3332

Dear Dr. Latortue :

The Computing Accreditation Commission (CAC) of ABET recently held its 2012 Summer Meeting to act on the program evaluations conducted during 2011-2012. Each evaluation was summarized in a report to the Commission and was considered by the full Commission before a vote was taken on the accreditation action. The results of the evaluation for University of Puerto Rico, Rio Piedras Campus are included in the enclosed Summary of Accreditation Actions. The Final Statement to your institution that discusses the findings on which each action was based is also enclosed.

The policy of ABET is to grant accreditation for a limited number of years, not to exceed six, in all cases. The period of accreditation is not an indication of program quality. Any restriction of the period of accreditation is based upon conditions indicating that compliance with the applicable accreditation criteria must be strengthened. Continuation of accreditation beyond the time specified requires a reevaluation of the program at the request of the institution as noted in the accreditation action. ABET policy prohibits public disclosure of the period for which a program is accredited. For further guidance concerning the public release of accreditation information, please refer to Section II.A. of the 2011-2012 Accreditation Policy and Procedure Manual (available at www.abet.org).

A list of accredited programs is published annually by ABET. Information about ABET accredited programs at your institution will be listed in the forthcoming ABET Accreditation Yearbook and on the ABET web site (www.abet.org).

It is the obligation of the officer responsible for ABET accredited programs at your institution to notify ABET of any significant changes in program title, personnel, curriculum, or other factors which could affect the accreditation status of a program during the period of accreditation stated in Section II.H. of the 2011-2012 Accreditation Policy and Procedure Manual (available at www.abet.org).

Please note that appeals are allowed only in the case of Not to Accredite actions. Also, such appeals may be based only on the conditions stated in Section II.L. of the 2011-2012 Accreditation Policy and Procedure Manual (available at www.abet.org).

Sincerely,

A handwritten signature in black ink, appearing to read "Harold Grossman". The signature is fluid and cursive, written in a professional style.

Harold Grossman, Chair
Computing Accreditation Commission

Enclosure: Summary of Accreditation Action
Final Statement

cc: Ana Guadalupe, Chancellor
Pedro J. Rodriguez Esquerdo, Chairman
Maria Teresa Jimenez, Professor
Evelyn Ramos, Assistant Dean of Students
Roy Jules Daigle, Visit Team Chair

ABET
Computing Accreditation Commission
Summary of Accreditation Actions
for the
2011-2012 Accreditation Cycle

**University of Puerto Rico, Rio Piedras Campus
San Juan, PR**

Computer Science (BS)

Accredit to September 30, 2016. A request to ABET by January 31, 2015 will be required to initiate a reaccreditation evaluation visit. In preparation for the visit, a Self-Study Report must be submitted to ABET by July 01, 2015. The reaccreditation evaluation will be a comprehensive general review.

Computer Information Systems (BBA)

Accredit to September 30, 2014. A request to ABET by January 31, 2013 will be required to initiate a reaccreditation report evaluation. A report describing the actions taken to correct shortcomings identified in the attached final statement must be submitted to ABET by July 01, 2013. The reaccreditation evaluation will focus on these shortcomings. Please note that a visit is not required.

This is a newly accredited program. Please note that this accreditation action extends retroactively from October 01, 2010.



Computing Accreditation Commission

Final Statement of Accreditation

to

UNIVERSITY OF PUERTO RICO, RIO PIEDRAS CAMPUS
San Juan, PR

2011 – 2012 Accreditation Cycle

FINAL STATEMENT

This is a confidential statement from the Computing Accreditation Commission to the institution. It is intended for internal use only and is not for release except as allowed by policies of ABET.

I. INTRODUCTION

The University of Puerto Rico, Rio Piedras Campus is the flagship university of the 11-campus University of Puerto Rico, the only public university in Puerto Rico. The University of Puerto Rico (all campuses) is accredited by the Middle States Commission on Higher Education. The Rio Piedras Campus is a comprehensive university with Carnegie classification Research University (high research activity), one of the three research campuses of the University of Puerto Rico. In the Rio Piedras College of Natural Sciences, one of every ten BS graduates continues on to complete a PhD in a discipline of the college.

The Rio Piedras Campus enrolls about 18,650 students, about 15,200 of whom are undergraduates. There are more than 1,000 tenured/tenure-track faculty members. The campus is urban and non-residential.

The following programs at the institution were evaluated during the 2011-12 cycle for possible accreditation:

- BS Degree in Computer Science, evaluated under the General Criteria and the Computer Science Program Criteria. The BS program in Computer Science was previously evaluated in the 2009-10 cycle. As a result of that accreditation action, the institution was required to submit an Interim Report for the 2011-2012 cycle.
- BBA Degree in Computer Information Systems, evaluated under the General Criteria and the Information Systems Program Criteria. The BBA program in Computer Information Systems has not previously been accredited.

The Computer Science program was evaluated under the CAC/ABET “Criteria for Accrediting Computing Programs” (*Criteria*) dated November 1, 2008. The Computer Information Systems program was evaluated under the CAC/ABET “Criteria for Accrediting Computing Programs” (*Criteria*) dated October 30, 2010:

The programs listed above were evaluated under the CAC/ABET “Criteria for Accrediting Computing Programs” (*Criteria*) dated October 30, 2010 by the peer review team shown below.

- Team Chair: Roy Jules Daigle, University of South Alabama
- Program Evaluator: George M. Kasper, Virginia Commonwealth University
- Program Evaluator: Richard Graber Mathieu, James Madison University
- Editor One: Judith L. Solano, University of North Florida
- Editor Two: Harold Grossman, Clemson University

Please note that program accreditation decisions are made solely by the respective Commissions of ABET. Reference to the professional affiliations of the volunteer peer evaluators in no way constitutes or implies endorsement or recommendation of the programs by the listed professional affiliations.

II. REPORT OF FINDINGS

The *Criteria* is composed of the General Criteria and Program Criteria. Each criterion provides the underlying principles that each program must meet. A program must meet both the General Criteria and all applicable Program Criteria to be accredited.

This section contains the findings from an evaluation of the interim report for the Computer Science program. Information on corrective actions submitted after the report will be considered during the evaluation of the institution's due process response to this draft statement.

This section contains the findings from the time of the visit for the Computer Information Systems program. It also includes an evaluation of any information provided by the program during the due process response. CAC considers the following comments to relate directly to its accreditation actions.

A program's accreditation action will be based upon the findings summarized in this statement. Actions will depend on the program's range of compliance or non-compliance with the criteria. This can be determined from the following terminology:

- **Deficiency:** A deficiency indicates that a criterion, policy, or procedure is not satisfied. Therefore, the program is not in compliance with the criteria.
- **Weakness:** A weakness indicates that a program lacks the strength of compliance with a criterion, policy, or procedure to ensure that the quality of the program will not be compromised. Therefore, remedial action is required to strengthen compliance with the criterion, policy, or procedure prior to the next evaluation.
- **Concern:** A concern indicates that a program currently satisfies a criterion, policy, or procedure; however, the potential exists for the situation to change such that the criterion, policy, or procedure may not be satisfied.
- **Observation:** An observation is a comment or suggestion that does not relate directly to the accreditation action but is offered to assist the institution in its continuing efforts to improve its programs.

BS in Computer Science Program

The Bachelor of Science in Computer Science program has been offered since 1994 at the Rio Piedras Campus, but the Department of Computer Science itself was created in 2002 as a unit of the College of Natural Sciences. The department counts 60 graduates, 45 in the last five years. There are currently 108 undergraduate students enrolled in the program, with six full-time and two part-time faculty members.

Currently the Department of Computer Science is the only department in the College of Natural Sciences without a graduate program, and all but one of the other departments in the college have PhD programs. In recognition of the importance of having graduate programs in order to meet the needs of Puerto Rico and to attract and retain good research faculty members, the college and university are planning to add MS and PhD programs in computer science during the next five years.

Status of Shortcomings from the Previous Review

Program Weaknesses

1. Criterion 3, Program Outcomes, part (d). There was no evidence of significant teamwork projects by the students on a consistent basis.

Actions Taken Since Last Report: The institution provided a copy of the syllabus, a copy of the final exam, a copy of the project teamwork rubric, five sample student projects, and project assessment results for the spring, 2011 semester Software Engineering course.

Evaluation of Actions Taken: The evidence provided documents the inclusion of team-oriented projects in the spring 2011, Software Engineering class and the assessment of these projects for the teaming program outcomes. The Software Engineering course, in its current format, has only been offered once, as an elective. Beginning fall 2011 the Software Engineering class is a required course for all computer science majors; it is an elective course for computer science majors under a previous catalog.

Status: The weakness is now a concern.

Due-process response: None received.

2. Criterion 4, Continuous Improvement. The regularity of the assessment/evaluation processes over a sustained period has not been demonstrated.

Actions Taken Since Last Report: The institution provided a copy of the assessment report for the second cycle of three assessment cycles and a copy of the institutional assessment semester report of institutional outcomes.

Evaluation of Actions Taken: The assessment reports, covering the period from spring 2010 through spring 2011, included a listing of program outcomes with associated assessment instruments, data collection information, success criteria, results of data analysis, and any recommended actions.

Status: The weakness has been resolved.

Program Concerns

1. Criterion 2, Program Educational Objectives. The new Program Educational Objectives have not yet been fully integrated into the public documents for the program.

Actions Taken Since Last Report: The institution provided a link to its public website for the program and a program brochure. The program objectives are stated, in a future tense, on a web page linked from the Department of Computer Science Home page. The program objectives are stated in an equivalent, present tense, version in the program brochure.

Evaluation of Actions Taken: Evidence provided indicates the program educational objectives have been integrated into public documents for the program.

Status: This concern has been resolved.

2. Criterion 3, Program Outcomes. The following factors contribute to this concern:
 - a. (Characteristic c) For most students, practical experience contributing to an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs occurs only in the database course.
 - b. (Characteristic e) Exposure to professional, ethical, legal, security, and social issues and responsibilities in the program is limited to the freshman seminars, which is too early to address these issues meaningfully in a realistic professional computer science context.
 - c. (Characteristic g) Topics relative to an ability to analyze the local and global impact of computing on individuals, organizations, and society are addressed only in the freshman seminars, which is too early to address these issues meaningfully in a realistic professional computer science context.

Actions Taken Since Last Report: The institution provided a copy of the syllabus, a copy of the final exam, a copy of the project teamwork rubric, five sample student projects, and project assessment results for the spring, 2011 semester Software Engineering course. The institution also provided a copy of the syllabus for the Computer Architecture I course.

Evaluation of Actions Taken:

- a. (Part c) The projects required in the Software Engineering course are of sufficient complexity to provide students with meaningful practical experience with design, implementation, and evaluation of a computer-based system. Beginning fall 2011 Software Engineering is a required course for all computer science majors; it is an elective course for computer science majors under a previous catalog.

- b. (Part e) The Software Engineering course syllabus lists a course outcome related to ethical issues of software development and topical coverage of “Ethical Issues in Software Engineering.” However, no information regarding topical coverage was provided and no evidence of assignments or student work was provided to demonstrate these were integrated into the course.
- c. (Part g) The Computer Architecture I course syllabus lists an outcome related to the effects of technology and its impact on individual and society. However, no information regarding topical coverage was provided and no evidence of assignments or student work was provided to demonstrate these were integrated into the course.

Status: The concern has been resolved for (part c), however, the concern remains for (part e) and (part g).

Due-process response: None received.

- 3. Criterion 6, Faculty. The following factors contribute to this concern:
 - a. Plans to add needed graduate programs include additional faculty positions to support the graduate programs minimally, as well as anticipated expansion in undergraduate enrollment. Given the current economic climate and the resulting limitations that have already begun, there is concern that if the plans for additional faculty hires are curtailed, there will not be sufficient faculty to support the additional graduate programs without degradation in the quality of the undergraduate program.
 - b. There is some evidence that gaining all required approvals for modifying a course can take several months after it is approved by the departmental faculty. In a dynamic and rapidly changing field such as computer science, many courses require continuous updating to remain current and relevant, and excessive delay in allowing needed updates to be implemented can be detrimental to the currency and relevancy of the program.

Actions Taken Since Last Review:

- a. The institution provided the names, vitas, and semester course assignments of three recently hired faculty members. One has a Ph.D. in Computer Science, another has a Ph.D. in Computer Science and Engineering, and the third has a Ph.D. in Computing and Information Science and Engineering. Each has prior experience teaching computer science courses and publications in computer science journals and refereed conference proceedings. Two have substantial experience in research funding. The course assignments cover the period from spring 2010 through fall 2011.
- b. The institution reported a timeframe of eight months for completion of the approval process for two courses submitted for changes last year. Four more course requests for changes have been submitted to this approval process. The requests are at different process points in the approval process.

Evaluation of Actions Taken:

Status: The concern has been resolved.

4. Criterion 7, Facilities. The plans for expanding the undergraduate program and initiating graduate programs will increase the need for technical support that is both available in a timely manner and adequate for the computing equipment in the laboratories. This situation raises a concern as to future compliance with this criterion should dedicated competent technical support for the computing facilities of the department not be provided.

Actions Taken Since Last Report: The institution has implemented an elective course to provide students with the opportunity to acquire hands-on experience with maintenance of computing resources for the Department of Computer Science. The elective course is to provide students with a valuable internship experience while simultaneously providing the department with additional support.

Evaluation of Actions Taken: No information was provided on whether the course had been offered, how many students might have taken the course, and whether these students were engaged in providing additional support. The effectiveness of this approach is yet to be determined.

Status: The concern remains.

Due-process response: None received.

5. Criterion 9, Program Criteria (Computer Science Program Criteria, part 3. k). The program's limited practical experience for students in constructing software systems raises a concern for continued enabling of an ability to apply design and development principles in the construction of software systems of varying complexity.

Actions Taken Since Last Report: The institution reported two changes that provide students with the opportunity to acquire an ability to apply design and development principles in the construction of software systems of varying complexity. First, the projects in the database were changed from an individual project to a team project and then the Software Engineering course was redesigned to be a team-oriented project that involved a real life client.

Evaluation of Actions Taken: Although no evidence was provided regarding the changes made to the database project, the student project reports provided from the Software Engineering class clearly achieve the intended objective.

Status: The concern has been resolved.

Findings from the Current Review

Other than the shortcomings identified above in the Status of Shortcomings from the Previous Review, the program satisfies all General Criteria and the Computer Science Program Criteria.

Computer Information Systems Program

The Bachelor of Business Administration in Computer Information Systems has been offered since 1980 at the Rio Piedras Campus. It was revised in 2008 in order to align with ABET standards. The department counts approximately 74 full-time and 22 part-time undergraduate students enrolled in the program, with seven full-time and two part-time faculty members.

Program Strengths

1. The program makes extensive use of a project-based learning approach, integrated throughout the curriculum. The development, execution, and evaluation of these student projects require a high level of commitment on the part of the program's faculty. Students learn to apply their knowledge and skills in projects designed to closely resemble ones they will encounter as IS professionals.

Findings from the Current Review

Program Weaknesses

1. Criterion 3, Student Outcomes. The criterion states that the program must have documented student outcomes that prepare graduates to attain the program educational objectives. The criterion also requires that the program enable students to attain "an ability to use current techniques, skills, and tools necessary for computing practice"(Characteristic (i)). The program marginally enables this characteristic; this constitutes a weakness. Some courses use end-user technologies (e.g., Access) in lieu of current professional technologies (e.g., Oracle or MS SQL Server). The textbook and course syllabus for Logical Systems Analysis and Design prescribe UML, but there is little evidence students are applying the UML techniques. Students are given extensive exposure to the client side of computing, but there is almost no exposure to the server-side of modern computing.

Due-process response: The institution provided a list of professional software tools and associated courses, which employ one or more of the software tools for student project activities. The institution also provided evidence of a recent purchase and installation of a Dell PowerEdge Server R510 to support server-side computing in the program.

Many of the tools listed are commonly available with a membership in the Microsoft Developer Network Academic Alliance (MSDNAA). Students are also encouraged to use software that may be freely downloaded for educational purposes. Among ones listed are Oracle, MySQL, and Dreamweaver.

Due-process evaluation: The weakness remains unresolved. Although students are encouraged to use end-user technologies in their course work, the sample student project provided with the response was completed using only Access. The design of exercises to

apply UML in the Analysis and Design course has not yet been completed, and the planned student use of the newly acquired server for server-side computing in the program has not yet been implemented.

Post due-process response: The institution provided evidence of student work applying UML from the Spring offering of the Analysis and Design course.

Post due-process response evaluation: The weakness remains unresolved. The design of exercises to apply UML in the Analysis and Design Course has been completed. However, evidence in support of the enablement of the ability to use current techniques, skills, and tools remains marginal. Although current professional technology tools are available, no evidence was provided for the use of these tools in student projects.

This weakness will be examined carefully at the next review. In preparation for that review, the CAC anticipates the preparation of documentation with respect to this shortcoming that focuses on the following items:

- * Evidence of student use of current professional technologies such as Oracle or MS SQL Server in projects
- * Evidence of student exposure to Server-Side computing.

2. Criterion 7, Facilities The criteria requires that modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. The equipment dedicated to providing majors with a development environment where they might be exposed to server-side technologies is marginal. The lack of appropriate equipment negatively affects the student's ability to attain the student outcomes and to support the program needs.

Due-process response: The institution reported completion and use of a remodeled technologically enhanced classroom, cited assignments in two required courses that provide students with experience in server-side technologies, and provided evidence of a recent purchase and installation of a rack-mounted Dell PowerEdge Server R510 to support server-side computing in the program, with local and external accessibility.

Due-process evaluation: The weakness has been resolved. The actions taken by the institution resolves all issues.

Program Concerns

- 1 Criterion 4, Continuous Improvement. The criterion requires that the program must regularly use appropriate, documented processes for assessing and evaluating the extent to which both the program educational objectives and the student outcomes are attained. The program has a well thought-out assessment of program educational objectives and student outcomes. However, because the process is only two years old and the department has only gone through one complete cycle on the student outcomes and two cycles on the program educational objectives, there is a concern the process has not yet been institutionalized.

Thus, the potential exists that continuous improvement may not continue to occur “regularly.”

Due-process response: The institution provided evidence of having assessed all program outcomes, reviewed results of actions initiated according to the previous cycle’s results, and analysis of the current cycle results.

Due-process evaluation: The concern has been resolved. The institution has demonstrated its commitment to continuous improvement.

2. Criterion 7, Facilities The criteria requires that modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. A new technology development plan calls for a five-year equipment replacement policy, which may be inadequate to support the use of current techniques, skills, and tools necessary for computing practice. The potential exists that the development of new technologies might not be supportable on five-year old equipment.

Due-process response: The institution reported that the Dean of the College of Business Administration has agreed to change from a five-year replacement policy to a three-year replacement policy. Four new laptops have been acquired for use by faculty. Funding requests have been made to the Dean of the College of Business Administration for six additional faculty computers and to the campus Technology Fund administration for computer replacement in a campus laboratory commonly used by CIS majors.

Due-process evaluation: The concern remains unresolved. Although an agreement has been reached for a three-year replacement plan and although some additional equipment has been acquired, there is a potential that the pending funding requests are not approved and that the situation may change such that the criterion is not satisfied in the future.

3. Criterion 8, Institutional Support. The criterion requires institutional support and leadership must be adequate to ensure the quality and continuity of the program. The resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. The university, college, and program have expressed a desire to hire new faculty with terminal degrees. As faculty attrition occurs, the potential exists for the resources to be insufficient to attract, retain, and provide for the continued professional development of terminally qualified faculty.

Due-process response: The institution reported continuing support for professional development of current faculty for presentations at conferences, enrollment in professional development seminars, and enrollment in bridge programs to complete a terminal degree. The institution also reported that several new faculty positions have been approved for the College of Business Administration, of which, one will be shared by the department.

Due-process evaluation: The concern remains unresolved. Although a new faculty position to be shared with the department has been approved, the position has not yet been filled.

Moreover, the current plan for recruitment does not include a plan for retaining and providing for continued professional development of the new hired faculty to ensure the quality and continuity of the program.

III. SUMMARY

The following is a summary of this evaluation for the University of Puerto Rico, Rio Piedras Campus during the 2011-12 cycle:

Computer Science Program

Concerns:

- Criterion 3, Program Outcomes. The following factors contribute to this concern:
 - a. (Characteristic d) Significant teamwork projects in the Software Engineering course must be consistently demonstrated.
 - b. (Characteristic e) Exposure to professional, ethical, legal, security, and social issues and responsibilities in the program is limited to the freshman seminars, which is too early to address these issues meaningfully in a realistic professional computer science context.
 - c. (Characteristic g) Topics relative to an ability to analyze the local and global impact of computing on individuals, organizations, and society are addressed only in the freshman seminars, which is too early to address these issues meaningfully in a realistic professional computer science context.
- Criterion 7, Facilities. The effectiveness of a planned elective course to provide students with internship experience while simultaneously providing the department with additional support has not been determined.

Computer Information Systems Program

Weaknesses:

- Criterion 3, Student Outcomes. The program's enabling of characteristic (i), an ability to use current techniques, skills, and tools necessary for computing practice is marginal. No evidence was provided of the use of current professional technology tools such as Oracle or MS SQL Server in student projects. Students are given extensive exposure to the client side of computing, but there is almost no exposure to the server-side of modern computing.

Concerns:

- Criterion 7, Facilities. There is a potential that the pending funding requests are not approved and that the situation may change such that the criterion is not potentially satisfied.
- Criterion 8, Institutional Support. As faculty attrition occurs, the potential exists for the resources to be insufficient to attract, retain, and provide for the continued professional development of terminally qualified faculty.