

ABET
Computing Accreditation Commission

FINAL STATEMENT
BS Information Systems program

to

UNIVERSITY OF HOUSTON-CLEAR LAKE
HOUSTON, TX

Dates of Visit:	November 11-13, 2007
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UNIVERSITY OF HOUSTON-CLEAR LAKE

FINAL STATEMENT 2007-2008 EVALUATION

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I. INTRODUCTION

The University of Houston–Clear Lake is an upper division state supported institution in the Clear Lake community of the Houston, Texas metropolitan region. There are 7,709 FTE students and 296 faculty members at the university.

The Computer Information Systems (CIS) program is one of three undergraduate programs in the Division of Computing and Mathematics in the School of Science and Computer Engineering. The other two undergraduate programs are Computer Science (CS), and Mathematics (MA). In addition to the three undergraduate programs, the division offers four masters programs in CS, CIS, MA, and Statistics. Other computing programs exist within the school, in computer systems engineering and software engineering. All programs are properly differentiated in official documents.

The Division of Computing and Mathematics has a total of 152 undergraduate students and 133 masters students. The equivalent of 13 faculty members in the Division of Computing and Mathematics are responsible for two undergraduate programs in CIS and CS as well as two masters programs in CIS and CS. The undergraduate CIS program has 47 FTE students; the undergraduate CS program has 55 FTE students. The masters programs in CS and CIS have a total of 109 FTE students.

The Computer Information Systems Program at the University of Houston-Clear Lake was evaluated by the Computing Accreditation Commission (CAC) of ABET in the 2005-2006 cycle and was accredited at that time.

The Computing Accreditation Commission (CAC) of ABET evaluated the BS Degree in Computer Information Systems of University of Houston-Clear Lake during the 2007-08 cycle for possible accreditation under the CAC/ABET “Criteria for Accrediting Computing Programs”, dated March 17, 2007.

II. REPORT OF FINDINGS FROM THE CAC EVALUATION VISIT

The *Criteria* are divided into eight major *categories*, each containing a statement of *intent* and *standards*. The intents provide the underlying principles that each program must meet to be accredited. The standards provide a description detailing how a program can meet the intent. A program can meet an intent by either satisfying all the associated standards or by demonstrating an alternate implementation.

This section contains the report of the findings at the time of the visit. CAC considers the following comments to relate directly to its accreditation actions. This section is structured as follows. For each category a statement summarizing whether the program meets its intent follows the statement of intent. All deficiencies, weaknesses, and concerns related to the category are then summarized, and detailed findings are presented. For better understanding, the reader may refer to a copy of the *Criteria*.

A. Objectives and Assessments

Intent: The program has documented educational objectives that are consistent with the mission of the institution. The program has in place processes to regularly assess its progress against its objectives and uses the results of the assessments to identify program improvements and to modify the program's objectives.

The program meets the intent of the Objectives and Assessments Category by satisfying all associated standards. However, there are concerns with respect to Standards I-1, I-3, I-4 and I-5 that constitute a weakness with respect to the Objectives and Assessments Category.

The program's objectives include expected outcomes for graduating students (Standard I-2). The program uses a number of instruments for assessment. The program has an active advisory board drawn from local industry that provides valuable input for assessment and program improvement. All faculty members are involved in the assessment of course outcomes.

The program has educational objectives which include expected outcomes for students, but these objectives are not consistently documented. Objectives presented in the self study are not consistent with those contained in the catalog and the program's web site. This is a concern with respect to Standard I-1 that contributes to a weakness in this category.

There are mechanisms in place to periodically review courses but there is a lack of mechanisms in place to periodically review the program as a whole. Data relative to course-level assessments has been gathered and used mainly in course-level improvements; however, the team did not find evidence that the data is aggregated and used in assessment of the overall program, nor did it find consistent documentation of program assessment results being used to help identify and implement program improvements. Thus, there are concerns with respect to Standards I-3, I-4, and I-5 that also contribute to a weakness in this category.

B. Students

Intent: Students can complete the program in a reasonable amount of time. Students have ample opportunity to interact with their instructors and are offered timely guidance and advice about the program's requirements and their career alternatives. Students who graduate the program meet all program requirements.

The program meets the intent of the Students Category by satisfying all associated standards with no concerns.

Courses are offered with sufficient frequency for students to complete the program in a timely manner (Standard II-1). Required courses are offered at least annually, and a number of advanced electives are offered annually. Students were complimentary of the willingness of the faculty members to offer courses with smaller enrollments in order to ensure timely completion of the program.

Computer Information Systems courses are structured in order to ensure effective interaction between faculty members and students (Standard II-2). Class sizes are limited to 30 students, and most classes have less than 20 students. Students stated that the smaller class sizes and the small student-to-faculty ratio are strengths of the program. Guidance on how to complete the program is available to all students, and all students have access to qualified advising in making both course decisions and career choices (Standard II-3). Students are advised by both the division-level professional advisors and by faculty advisors. Students commented that UHCL advisors are accessible for students planning to transfer from community colleges.

Appropriate mechanisms appear to be in place to ensure that graduates meet the requirements of the program. Because curriculum recommendations from the previous visit were implemented only after that visit and because this is a two year upper division institution, the transcripts evaluated were not for students who graduated using the current requirements. However, two transcripts for students who were completing the CIS program in the fall of 2007 were found to have all of the required courses (Standard II-4).

C. Faculty

The program meets the intent of the Faculty Category by satisfying all associated standards with no concerns.

There are the equivalent of thirteen faculty members shared between the Computer Information Systems and Computer Science programs. The four faculty members who have primary commitment to Computer Information Systems and the remaining equivalent of nine, who provide support by teaching either required or elective courses, are well qualified and capable of teaching a variety of courses and planning and modifying both the courses and the program (Standard III-1). Students complimented the dedication of the faculty to the students.

Three faculty members with primary commitment to the Computer Information Systems program have graduate work in information systems. The remaining faculty members with either primary or general commitment to the program have attained a level competence that would normally be obtained through graduate work in information systems through their professional experiences of teaching, consulting, and publishing (Standard III-2). Of the fourteen individuals (equivalent of thirteen faculty members) shared between the Computer Information Systems and Computer Science programs, twelve hold a PhD. Of those with primary commitment to the CIS program, one holds a PhD in Information Systems and one holds a PhD in Computer Information Science (Standard III-3). Those faculty members with primary commitment to the Computer Information Systems program have demonstrated their commitment to remaining current in information systems through their attendance, publications, and presentations at information systems centered conferences. Faculty members are current in the discipline, and a number have received or have been nominated for prestigious teaching and/or research awards (Standard III-4).

D. Curriculum

Intent: The curriculum combines professional requirements with general education requirements and electives to prepare students for a professional career in the information systems field, for further study in information systems, and for functioning in modern society. The professional requirements include coverage of basic and advanced topics in information systems as well as an emphasis on an IS environment. Curricula are consistent with widely recognized models and standards.

At the time of the visit, the intent of the Curriculum Category was not met. Standards IV-5, IV-6, IV-7, IV-8, IV-9, IV-14, IV-15, and IV-16 were not satisfied, and the institution did not demonstrate that the intent of this category was met by some alternate means. This is a deficiency with respect to the Curriculum Category.

General

The curriculum requires a total of 45 hours of computer information systems courses (Standard IV-1). Even after three of the listed 22.5 hours of IS Environment were excluded, (U.S. Government) the remaining 19.5 hours of business form a cohesive body of knowledge to prepare students to function effectively as an IS professional (Standard IV-2). There is at least 10.5 semester hours of study in quantitative analysis and at least 39 semester hours of study in general education (Standards IV-3 and IV-4).

Information Systems

The course materials display usually provides evidence of breadth and depth of coverage in single courses, proficiency over several courses, application of grading standards, assessment of skills such as writing, presentations, and teaming, and coverage of social and ethical implications of computing. Although the physical layout of materials was organized, the course materials for individual courses were incomplete and unorganized. The team attempted to gain understanding from what was available, but, because of the inconsistencies and incompleteness, it was not

possible to determine breadth or depth of coverage in the core, the specific level of coverage of requisite core topics, and the stress on theoretical foundations, analysis and design within the program. Standards IV-5, IV-6, and IV-7 were not satisfied; this is a deficiency in the Curriculum Category.

The team examined the available, albeit incomplete, course material displays for any evidence related to programming language coverage. Although students were exposed to a large number of programming languages, including C, C++, Java, Assembly, and Pascal (or Visual Basic), and systems, the Java course, did not appear to build upon the basic programming concepts from the C and Pascal (or Visual Basic) courses—from the available course display materials, it appears to be delivered as though it too were a first programming course studied. Furthermore upper level courses such as Data Structures allowed students to choose among C, C++, and Java for assignment completion, rather than specifying one so that proficiency could be developed. Without corroborating evidence from the course material display, the team could not determine whether or not students become proficient in one language. Standard IV-8 was not satisfied; this is a deficiency in the Curriculum Category.

Some of the courses counted within the category table as Advanced Information Systems content did not appear to be advanced. Moreover, students could select 6 hours of advanced information systems elective coursework from three additional programming courses (OO Design and Programming, Advanced Java, and C# and .Net). The course display was insufficient to determine conclusively whether or not these courses provide breadth and build upon the core. The team could not determine the depth of coverage relationships between the elective information systems network protocol course and the required computer engineering telecommunication. Standard IV-9 was not satisfied; this is a deficiency in the Curriculum Category.

Information Systems Environment

After three of the listed 22.5 hours of IS Environment were excluded (U.S. Government), the remaining 19.5 hours of business form a cohesive body of knowledge to prepare students to function effectively as an IS professional (Standard IV-10).

Quantitative Analysis

There are at least 10.5 semester hours of study in quantitative analysis beyond pre-calculus (Standard IV-11). A statistics course is required (Standard IV-12), and both calculus and discrete mathematics are required (Standard IV-13).

Additional Areas of Study

Because of the incompleteness of the course display, it could not be confirmed that the oral and written communications were developed and applied in the program. From the student interview session, those present stated that they had done very few presentations but had submitted several

written assignments. Standard IV-14 was not satisfied; this is a deficiency in the Curriculum Category.

The self-study reported coverage of social and ethical implications of computing among several courses rather than in a single course. The self-study also reported that collaborative skills are developed and applied in several courses in the program. Because of the incompleteness and the lack of organization of the display materials associated with these courses, it could not be determined if there was sufficient coverage of social and ethical implications of computing, nor could it be determined where development of collaborative skills occurred and the extent of their application. Standards IV-15 and IV-16 were not satisfied; this is a deficiency in the Curriculum Category.

E. Technology Infrastructure

Intent: Computer resources are available, accessible, and adequately supported to enable students to complete their course work and to support faculty teaching needs and scholarly activities.

The program meets the intent of the Technology Infrastructure Category by satisfying all associated standards with no concerns.

Computer Information Systems students have access to institutional labs maintained by the university as well as five specialized teaching labs for computer information systems and computer science: a Unix lab, a Windows lab, a Systems Administration lab, a Distributed Computer Security Laboratory, and a Capstone lab (Standard V-1). Web pages provide readily accessible documentation for both institutional labs and the five specialized computing labs (Standard V-2). Each faculty member has access to adequate computing facilities for both class preparation and for scholarly activities; many have more than one computer system for office use. Office computers are replaced every three to four years (Standard V-3). Personnel from the University Computing and Telecommunications group maintain the institutional labs; a half-time systems administrator and a half-time technology specialist maintain the five specialized computing labs (Standard V-4). Laboratory assistants provide instructional support in the institutional laboratories; teaching assistants provide assistance in the five specialized computing labs (Standard V-5).

F. Institutional Support and Financial Resources

Intent: The institution's support for the program and the financial resources available to the program are sufficient to provide an environment in which the program can achieve its objectives. Support and resources are sufficient to provide assurance that an accredited program will retain its strength throughout the period of accreditation.

The program meets the intent of the Institutional Support and Financial Resources Category by satisfying all associated standards with no concerns.

Many faculty members have received or have been nominated for awards of teaching excellence and have been awarded university support for faculty research projects. Faculty maintain their competence as teachers and scholars through attendance and presentations at national professional meetings and conferences, publications, internally/externally funded projects, and collaboration with high-tech industries affiliated with NASA's Johnson Space Center (Standards VI-1, VI-2, and VI-3).

Office support is adequate for the type of program, the level of scholarly activity, and the needs of the faculty members (Standard VI-4). Although no formal release time is provided for program administration, other release time and flexible teaching scheduling for the administrators affords adequate time to administer the program (Standard VI-5). Upper levels of administration provide the program with the resources and atmosphere needed to function effectively with the rest of the university (Standard VI-6). Resources are provided to acquire, maintain, and operate excellent laboratory facilities that meet the needs of the program (Standard VI-7). Resources are provided to support library and related information retrieval facilities that meet the needs of the program (Standard VI-8). There is evidence that the Institutional support and financial resources will remain in place throughout the period of accreditation (Standard VI-9).

G. Program Delivery

Intent: There are enough faculty members to cover the curriculum reasonably and to allow an appropriate mix of teaching and scholarly activity.

The program meets the intent of the Program Delivery Category by satisfying all associated standards with no concerns.

There are the equivalent of thirteen faculty members shared between the Computer Science and Computer Information Systems programs. The four faculty members who have primary commitment to Computer Information Systems and the remaining equivalent of nine, who provide support by teaching either required or elective courses, are adequate to provide continuity and stability of the program (Standard VII-1). Full-time faculty members oversee all course work and cover most of the classroom instruction (Standards VII-2 and VII-3). Those faculty members with primary commitment to the Computer Information Systems program have demonstrated their commitment to remaining current in information systems through their attendance, publications, and presentations at information systems centered conferences. Faculty members are current in the discipline, and a number have received or have been nominated for prestigious teaching and/or research awards (Standards VII-4). Faculty members have active scholarly activities and professional development (Standard VII-5). Advising duties are recognized as a part of the faculty members' workloads (Standard VII-6).

H. Institutional Facilities

Intent: Institutional facilities including the library, other electronic information retrieval systems, computer networks, classrooms, and offices are adequate to support the objectives of the program.

The program meets the intent of the Institutional Facilities Category by satisfying all associated standards with no concerns.

Interviews with a library representative and faculty indicate satisfaction with the library resources. The library is adequately staffed with professional librarians and support personnel (Standard VIII-1). The library's technical collection is adequate to support the program (Standard VIII-2). The library supports a number of systems for locating and obtaining electronic information online, including ACM, IEEE, Computing Reviews Online, Web of Science, Ebrary, Safari Tech Books Online, NetLibrary, and Applied Science Full-Text (Standard VIII-3). Classrooms are well-equipped with workstation access to the internet as well as projectors and audio/video equipment (Standard VIII-4), and faculty offices are satisfactory for interaction with students and for their professional needs (Standard VIII-5).

I. ABET Policies and Procedures

The ABET Policies and Procedures, section II.E.c.(10) requires that the institution exhibit samples of student work that reveal the spectrum of educational outcomes, including sufficient examples of student work in technical courses and to demonstrate compliance with the requirement for student competence in written and oral communication. The course displays provided to the team lacked compliance with this provision, as they were incomplete and not organized effectively to allow the team to determine compliance with several elements of the Curriculum Category. This is a deficiency with respect to the ABET Policies and Procedures.

J. Observations

The following is a summary of observations made during the visit:

1. Consideration should be given to explicitly recognizing administrative responsibilities of the department and division chairs.
2. Because faculty members are shared between the CIS and CS programs, a more clear delineation of where primary commitments of each faculty member lie would be helpful to evaluation teams.

III. ACTIONS SINCE THE VISIT

1. At the time of the visit, there was a deficiency in the Curriculum Category. Inadequacy of the course materials provided to the team resulted in Standards IV-5, IV-6, IV-7, IV-8, IV-9, IV-14, IV-15, and IV-16 not being satisfied. The display problem also resulted in a deficiency with respect to the ABET Policies and Procedures Manual.

The following is a summary of the program's response to these deficiencies.

- a. Plans were noted to teach the Java course as an introductory course to compensate for the perceived lack of rigor in transfer introductory programming courses and then to build upon Java in the CSCI 3333 Data Structures course.
- b. A CD consisting of course display materials for the program was provided for review.

The course display materials in (b) were incomplete. Nevertheless, from the course materials provided, there is a broad-based core of fundamental information systems material consisting of at least 12 hours (Standard IV-5); there is basic coverage of hardware and software, a modern programming language, data management, networking and telecommunications, analysis and design, and role of IS in organizations (Standard IV-6); and there is at least 12 semester hours of advanced course work in information systems that provides breadth and builds on the information systems core (Standard IV-9). However, the definition of the core as described in the self-study is inconsistent with data in the course materials. This results in inconsistent accounting of core and advanced course coverage in the program, and mitigates the ability to determine the strength of compliance with Standards IV-5, IV-6 and IV-9. Therefore, although these standards are satisfied there are concerns with respect to each of them that contribute to a weakness in the Curriculum Category.

Although the course display materials are incomplete, there are sufficient materials to conclude evidence that theoretical foundations, analysis, and design are stressed throughout the program. Standard IV-7 is satisfied.

The course display materials provide evidence that students are exposed to a variety of information and computing systems. However, even if the plans described in (a) are implemented, allowing majors the choice of C++ in CSCI 3333 may not insure that all graduates become proficient in at least one high-level language. Standard IV-8 is satisfied, but there is a concern with respect to this standard that also contributes to a weakness in this category.

Although the course display materials in (b) were incomplete, there were sufficient materials to conclude that oral, written communication are developed and applied in the program (Standard IV-14) that there is sufficient coverage of social and ethical implications of computing to give students an understanding of a broad range of issues in this area (Standard IV-15), and that collaborative skills are developed and applied in the program (Standard IV-16).

The course materials provided in the CD are sufficient to remove the deficiency with respect to the ABET Policies and Procedures Manual (APPM). However, because at the time of the visit these materials were incomplete and poorly organized, and since even the additional materials provided were not complete, a concern remains with respect to the APPM.

2. At the time of the visit there was a weakness in the Objectives and Assessment Category, associated with Standards I-1, I-3, I-4 and I-5. Program objectives were not consistently stated, data relative to program-level assessment was not documented, program improvements were not clearly tied to assessment activity, and there was not clear and consistent documentation of the results and actions taken based on assessment.

Since the visit, the program has updated the objectives on the CS website and has submitted the same set of objectives to update the 2008-2009 catalog to be distributed in the Fall of 2008. However, these objectives do not appear to include statements related to the accomplishments expected of graduates of the program (i.e., program educational objectives). Thus, the concern relative to Standard I-1 remains, and continues to contribute to a weakness in this category.

The program also has implemented a password protected, intranet for CS and CIS for assessment documentation. The format uses a multi-column format, collecting information related to specific learning outcomes and program outcomes: Assessment Methods, Criteria for Successes, Assessment Results, Use of Results, and Funds needed. From the samples in the response to the draft, the intranet is also used to collect faculty meeting minutes. A sample of the faculty meeting minutes documents a faculty discussion of data collected from a CIS survey. Although this represents an improvement in data collection and documentation, and offers some evidence that data collected are used in assessment, there is no specific plan for periodic collection and review of the data. Thus, the concern with respect to Standard I-3 also remains, and continues to contribute to a weakness in this category.

While the response shows some documentation of program assessments and their use in identifying opportunities for improvement, there is a lack of systematic evidence of this nature. Moreover, the lack of apparent assessment of program educational objectives limits the effectiveness of the procedures in use. Therefore, the concerns with respect to Standards I-4 and I-5 remain, and continue to contribute to a weakness in this category.

IV. CONCLUSIONS

The following is a summary of the current status of the program relative to the continuing concerns from the 2005-2006 visit:

1. (Standard III-1) Faculty member participation in IS-related activities is minimal; therefore, faculty members are only marginally aware of current developments in information systems.

Status: No longer a concern.

2. (Standard III-2) Faculty members' graduate work in information systems is marginal.

Status: No longer a concern.

3. (Standard III-3) Only one faculty member who has just been hired has a Ph.D. in Information Systems

Status: No longer a concern.

4. (Standard III-4) Faculty members show only limited currency in information systems.

Status: No longer a concern.

5. (Standard IV-5) The core is not sufficiently broad-based with good coverage of analysis and the role of IS in organizations to satisfy national norms.

Status: Still a concern, contributing to a weakness, because the definitions of core and advanced coverage in the program are inconsistent with the usage of these terms in the course materials provided. This results in an inconsistent accounting of broad-based core and advanced course work.

6. (Standard IV-6) There is not good coverage of analysis and the role of IS in organizations.

Status: No longer a concern.

7. (Standard IV-7) Theoretical foundations of information systems are not covered well.

Status: No longer a concern.

8. (Standard IV-9) Advanced course work does not cover analysis and the role of IS in organizations well.

Status: Still a concern, contributing to a weakness, because the definitions of core and advanced coverage in the program are inconsistent with the usage of these terms in the course materials provided. This results in an inconsistent accounting of broad-based core and advanced course work.

9. (Standard VII-4). Faculty members are only marginally current in the information systems discipline.

Status: No longer a concern.

10. (Standard II-4) No effective mechanism is in place to check course prerequisites.

Status: No longer a concern.

The program meets the intent for all of the eight categories in the *Criteria*.

However, there are concerns with respect to Standards I-1, I-3, I-4, and I-5 that contribute to a weakness in the Objectives and Assessments Category and concerns with respect to Standards IV-5, IV-6, IV-8, IV-9 that contribute to a weakness in the Curriculum Category.

1. (Standard I-1) Delineation of program educational objectives on the website and the 2008-2009 course catalog should be made more clearer.
2. (Standard I-3) While there is evidence that data collected are used in assessment, mechanisms in place for periodic review are limited.
3. (Standard I-4) Systematic use of program level assessment and the lack of apparent assessment of program educational objectives limits the capability of the process to identify and implement program improvements.
4. (Standard I-5) Systematic documentation of the program's review and actions is limited. Moreover, the lack of apparent assessment of program educational objectives limits the effectiveness of the documentation procedures in use.
5. (Standard IV-5). The inconsistent definitions of core and advanced coverage in the program, and the resulting inconsistent accounting of broad-based core of fundamental information systems material, mitigate the ability to determine the strength of compliance with this standard.
6. (Standard IV-6) The inconsistent definitions of core and advanced coverage in the program, and the resulting inconsistent accounting of basic coverage of hardware and software, a modern programming language, data management, networking and telecommunications, analysis and design, and role of IS in organizations, mitigate the ability to determine the strength of compliance with this standard.
7. (Standard IV-8) Allowing majors the choice of C++ in CSCI 3333 may not insure that all students become proficient in at least one high-level language.
8. (Standard IV-9) The inconsistent definitions of core and advanced coverage in the program, and the resulting inconsistent accounting of advanced course work that provides breadth and builds on the core to provide depth, mitigate the ability to determine the strength of compliance with this standard.

The program meets the intent for all other categories in the *Criteria* by satisfying the associated standards. However, the following concern associated with ABET Policies and Procedures was identified.

1. (ABET Policies and Procedures) Incomplete and ineffectively organized course display materials may compromise the ability of the team to determine compliance with the criteria.

These weaknesses and this concern may affect the stability, quality, or future accreditation of the program and will be of special interest in the next evaluation.