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No-Nonsense Guide to CSAB/CSAC Accreditation

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ABSTRACT

CSAB/CSAC provides professional accreditation of computer science bachelor's degree programs in the United States. As of October 2000, 159 institutions held this accreditation. By our count, over 80% of the accredited programs were offered by departments which also offer graduate programs in computer science. This means that few small colleges are represented. Our intent in this work is to give the small college audience an up-to-date guide to the recently-revised CSAB/CSAC accreditation standards. The guide is not comprehensive; we emphasize those issues we believe to be of greatest interest to small colleges and address them from the perspective we have gained from our own recent accreditation evaluation.

INTRODUCTION

The Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board (CSAB) administers the accreditation of bachelor's degree programs in computer science in the United States and its territories. Its member societies are the Association for Computing Machinery (ACM) and the IEEE Computer Society (IEEE-CS). CSAB/CSAC is in the process of being integrated into the Accreditation Board for Engineering and Technology (ABET), which is a federation of professional engineering and technical societies.

The CSAB web site, www.csab.org, has detailed information on this and many other topics, and serves as the primary reference for this paper. The secondary reference is our departmental experience with accreditation including a recent program evaluation visit. In accordance with CSAB/CSAC public release policies, no correspondence or contents of documents between CSAB/CSAC and our institution will be quoted. Our intent is to provide information which individuals and departments involved in the Consortium for Computing in Small Colleges will find useful in deciding whether to pursue accreditation.

We will first cover some practical matters followed by an overview of the 2000 accreditation criteria and finally details on a few selected accreditation categories which should be of special interest to CCSC members. Our treatment of these categories is not

comprehensive; we simply wish to highlight some relevant issues. Please refer to the CSAB web site for detailed information on accreditation.

PRACTICAL MATTERS

Timeline: You must apply for accreditation evaluation by the end of January and submit a self-study report by the end of June. The campus visit team will be organized during the summer. The two-day campus visit occurs in the fall, concluding with an oral report of preliminary findings. This is followed by a written preliminary statement sent to the school the following March. There is a 30-day period for the school to respond. The Annual Accreditation Assembly meets in July to make the final decisions, and the Final Statement of Evaluation Findings is mailed to the school in August or September. The entire process from beginning of preparations until certification of accreditation requires about two years.

Cost: After applying for an accreditation evaluation, you will be billed a $6,100 evaluation fee. Once accredited, there is an annual $675 maintenance fee. After a favorable accreditation decision, the annual fee must be submitted before the Certificate of Accreditation is mailed.

Self-study: Applicants for accreditation are required to submit a self-study document several months in advance of the evaluation visit. A self-study questionnaire template (Adobe PDF or Word format) can be downloaded from the CSAB web site for you to fill in. It also has a sample completed self-study from a fictitious university that you can download and inspect. We found this a very useful guide concerning the expected level of detail. Plan to start working on the self-study well in advance; Christmas break is not too soon to start. You will require information and documentation from all faculty who teach courses in your program as well as faculty from other departments and a number of administrators. We developed a spreadsheet to track each report item, including who was responsible for providing it, when it was due, when it was turned in, when it was reviewed and when it was integrated into the report. Our self-study turned out to be 144 pages in length with an additional 103 pages of appendices, using 10-point Times font.

Exhibit: Prior to the evaluation visit, an exhibit of materials must be prepared. This covers each course that can be counted as meeting computer science requirements, whether the course is offered by your department or by a different one. For each course, the exhibit must include copies of textbook(s) and reference books, syllabus, assignments, and examples of graded student work on assignments and exams. Examples of good, average, and poor quality work are to be included. We took the precaution of having students sign release forms permitting us to copy their work. They had the option to refuse permission but only two students selected this option. Collection of materials for a course should begin during the last offering of the course prior to the semester of the visit. In the case of electives, this could be two years or more. If a course has not been offered for several years, provide a folder containing as much information as you can. It is important that a folder be provided for every course; the campus visit team will inspect them during the first day of their visit.

Information Resources: There are several easily accessible sources of information about accreditation. Here are a few.

1. The CSAB web site is www.csab.org. It contains information concerning the organization itself, accreditation criteria and guidance, evaluation visit requirements and timelines, and related information. This site also includes a state-by-state list of institutions with accredited programs, which is updated each October.

2. For the past several years, we have supplemented the state-by-state list by providing a similar web page with links to home pages of the departments offering the accredited programs. This page is updated annually in January and is found at www.cs.smsu.edu/~pete/accredited.html. We have found this extremely useful for conducting both selective and exhaustive surveys for the types of information almost universally available, such as degree program and course descriptions.

3. Another useful source of information is provided by Renée McCauley and Bill Manaris of the College of Charleston, who conduct an annual survey of accredited programs and publish survey results as technical reports and on the web. The 1999 survey is now available [2], and contains links to previous surveys. Its respondents represent about 40% of accredited programs.

4. CSAB normally conducts an accreditation training seminar during the annual SIGCSE Technical Symposium. It is not part of the symposium itself, so you need to contact CSAB directly or visit their web site for specific details. You may register as an observer for $75, which includes a copy of handout materials.

Is this possible? By the time you finish reading this paper, you may well conclude that achieving accreditation is not feasible at your institution. This may very well be true, but in order to entice you to continue reading, we will give you at least this encouragement: about 30 accredited programs, or about 20% of the total, are housed in departments which do not offer any graduate degrees. We discovered this by visiting departmental web sites for all accredited programs.

CSAC CRITERIA 2000

Revised accreditation criteria were formally adopted in January 2000 after a two-year pilot program. There are now seven categories of criteria: Objectives and Assessments, Student Support, Faculty, Curriculum, Laboratories and Computing Facilities, Institutional Support and Financial Resources, and Institutional Facilities. Each of these seven categories begins with a statement of Intent followed by a list of Standards. An Intent expresses the principles for that category and its associated Standards describe how the Intent can minimally be met. Besides meeting the Standards, it is also possible to achieve the Intent by "demonstrating an alternative approach" to the Commission's satisfaction. The "alternative approach" clause is not explained further, but we have heard it referred to as a means by which smaller colleges can achieve accreditation.

Something new for Criteria 2000 is an accompanying Guidance document, which is organized by the categories and standards of the Criteria. For each category, it provides a numbered list of statements that are referenced to specific Standards. The Guidance document states that guidance is provided only to clarify the Standards and should not be considered prescriptive. Moreover, the Guidance document is not comprehensive; there are Standards with no corresponding guidelines.

As an example, Guidance statement 10 under Faculty is: "At least 25% of the total faculty effort (FTEs) should be devoted to scholarly activities." It is cross-referenced to Faculty Standard 8, which states: "All full-time faculty members must have sufficient time for scholarly activities and professional development." Notice that the Standard used the term "must" whereas the Guidance used the term "should". Every one of the 56 Standards in Criteria 2000 use the term "must." By contrast, 42 of the 53 statements in Guidance 2000 use the terms "should", "could", "can", or "may" but none of them use "must." Clarity is gained at the cost of definitiveness. This gives the evaluators, the Commission, and the department some wriggle room. Small colleges may need this to meet standards such as this one.

The CSAB web site also includes the 1996 Criteria document and two cross-reference documents between the 1996 criteria and the 2000 criteria and guidance. This information mainly benefits those whose programs were accredited under the 1996 criteria. For those seeking initial accreditation, it is useful to discover whether and how particular criteria may have changed from the old to the new version.

FACULTY

Category III in Criteria 2000 is Faculty. There are not many changes in the transition from 1996 to 2000, but these could be significant to small colleges.

One 1996 criteria reads: "A majority of the faculty should hold a terminal degree and some should have a Ph.D. in computer science or equivalent qualifications." The corresponding 2000 Standard is: "Some full-time faculty members must have a Ph.D. in computer science." There is no guidance statement associated with this Standard. The 1996 clause about terminal degrees is now in a guidance statement cross referenced to a different Standard requiring all faculty members to have level of competence normally obtained through graduate work in computer science.

Language concerning the number of faculty is definitely of interest to the small college seeking accreditation. The 1996 criterion reads: "typically, a program should have a minimum of five FTE faculty, of which four should be full-time faculty with primary commitment to the program." This is addressed in Criteria 2000 by moving that statement verbatim into the Guidance document. It is cross referenced to these two Standards:

III-1. There must be enough full-time faculty members with primary commitment to the program to provide continuity and stability.

III-4. The interests and qualifications of the faculty members must be sufficient to teach the courses and to plan and modify the courses and curriculum.

The term "primary commitment" is defined in the Guidance document as "the majority of her/his activities are in direct support of the program."

The 1996 criterion that "faculty time devoted to scholarly activities should average about 25 percent" has been addressed in Criteria 2000 by the Standard and Guidance used as the example in the **CSAC Criteria 2000** section above. Notably, the term "faculty" has been replaced by "full-time faculty" in the new Standard.

CURRICULUM

The curriculum standards are largely unchanged from 1996 to 2000. Please refer to the CSAB web site for complete details. We will summarize most of them here, so you can determine at a glance whether your curriculum is "in the ballpark." The 2000 Criteria contains 14 curriculum Standards. Many of the standards mention a specific number of semester hours. Multiply by 1.5 to convert them to quarter hours.

There are four subcategories of Standards: General, Computer Science, Mathematics and Science, and Additional Areas of Study. Within a subcategory, the credit hours of a course can be applied toward more than one Standard so long as no specific part of the course is applied toward more than one. When determining to which Standard (if any) a course's credit hours should be applied, accreditors are more concerned with course content than with course designation (CS, MATH, etc.). Their determination will be based on the detailed course description provided with the self-study along with Exhibit material. Be objective and realistic about allocating credit hours as you develop your self-study to avoid any unpleasant surprises during the evaluation visit.

You must require at least 40 semester hours of "up-to-date" computer science material. This must include a core of at least 16 semester hours of algorithms, data structures, software design, concepts of programming languages, and computer organization and architecture. You must also require at least 16 semester hours of advanced course work in computer science. Examples of advanced coursework are listed in the Guidance and include such things as computer networks, artificial intelligence, and operating systems. Computer science material may be covered in courses other than computer science courses. Students must be proficient in at least one high-level programming language and exposed to a variety of languages. There should be at least one semester hour of study of social and ethical issues in computing. In addition, the program must provide for the development and application of oral and written communication skills.

You must require at least 30 semester hours of mathematics and science. Of this, at least 15 hours must be of mathematics, to include discrete mathematics, differential and integral calculus, and probability and statistics. Mathematics material may be covered in courses other than mathematics courses. At least 12 of the 30 hours must be of science, to include the equivalent of a two-semester sequence in a laboratory science for science or engineering majors plus additional science course(s) designed for science or engineering majors.

You must also require at least 30 semester hours of study in humanities, social sciences and other liberal arts, exclusive of the above.

OBJECTIVES AND ASSESSMENTS

Category I in Criteria 2000 is Objectives and Assessments. This category has changed the most since 1996, with three of its six standards listed in the 2000-1996 cross reference as new standards. It is also significant that this has moved from being a subcategory within 1996 category VII Institutional Support to being not only a full category, but the first one listed. The Standards (http://www.csab.org/criteria2k_v10.html) bear listing:

I-1. The program must have documented, measurable objectives.

I-2. The program's objectives must include expected outcomes for graduating seniors.

I-3. Data relative to the objectives must be routinely collected and documented, and used in program assessments.

I-4. The extent to which each program objective is being met must be periodically assessed.

I-5. The results of the program's periodic assessments must be used to help identify opportunities for program improvement.

I-6. The results of the program's assessments and the actions taken based on the results must be documented.

A department seeking initial or renewed accreditation should have an assessment plan that covers these items as well as documentation supporting not only the collection of assessment data but their use in propelling or justifying program improvements. Documentation supporting its use may consist of minutes of relevant departmental or curriculum committee meetings, or copies of curriculum change proposals with assessment results listed as justification in the proposal.

Assessment has been a hot SIGCSE Technical Symposium topic in recent years (see [1], [3]). One of the leaders in the Central Plains region is the Computer Science / Information Systems Department at Northwest Missouri State University [3]. We have been inspired by their model and have used it to guide our own efforts. It is significant that this category is now called Objectives and Assessment and not just Assessment as before. As our colleagues at NWMSU would tell us, it is important that objectives be established first then used to determine what assessment measures should be defined. After initially expanding our list of assessment measures in response to the new CSAB criteria, we are now in the process of refining them to reduce the number of assessment instruments without reducing our ability to assess program objectives.

OTHER CATEGORIES

All seven of the Criteria 2000 categories are important, but those discussed above, especially faculty and curriculum, must be addressed or addressable to even consider applying for accreditation. We will briefly highlight the other four:

Student Support: The main concern here is that the program support a student's ability to complete the program in a reasonable amount of time. This includes access to faculty both in and outside the classroom, reasonably sized classes, advising and guidance, availability of program information, and frequent, reliable and predictable availability of courses. Accreditors will also inspect randomly selected transcripts of recent graduates to assure that all program and university requirements are met.

Laboratories and Computing Facilities: In this category, accreditors will look for adequate student access to computing facilities and software (especially compilers) required by the program, closed laboratories that provide one workstation per student, network connectivity for students and faculty, and adequate computing facilities in faculty offices.

Institutional Support and Financial Resources: This category encompasses faculty quality-of-life issues (salaries, sabbatical policies, teaching loads), office support, and financial support for the program from your institution's administration.

Institutional Facilities: Major concerns here are library facilities in general and the computer science technical collection in particular, including trade journals especially from ACM and IEEE-CS, network access from classrooms, and adequate faculty office size (unspecified, but individual offices of 100 square feet or more should qualify).

SUMMARY

Accreditation by CSAB/CSAC offers definite benefits in terms of recruiting students into your program and of your departmental reputation among employers and graduate schools. Many top institutions have favorable reputations anyway and choose not to pursue it. Others see the benefits but feel the costs (both monetary and curricular restraints) are not justified. Many institutions, including most small colleges, simply cannot meet some of the requirements. As a result, only 159 programs are accredited nationwide.

We neither encourage nor discourage you from seeking accreditation, but simply wish to use our recent experiences to provide you with up-to-date information concerning current accreditation criteria, standards and practice. The Commission seems to encourage smaller institutions to pursue accreditation by allowing them to satisfy an Intent by "demonstrating an alternative approach" when its Standards cannot be met. We do not have experience with this approach so do not know how realistic it is. As we stated earlier, however, about 20% of all accredited programs are offered by bachelor's level departments. We hope you find the information provided here useful in determining whether or when to pursue accreditation.

REFERENCES

[1] Fitzgerald, Sue (panel moderator), *Student Outcomes Assessment: What Works and What Doesn't*, Proceedings of the Thirty-first SIGCSE 2000 Technical Symposium, Austin TX, March 2000.

[2] McCauley, Renée, and Manaris, Bill, *Comprehensive Report on the 1999 Survey of Departments Offering CSAC/CSAB-Accredited Degree Programs*, technical report CoC/CS TR# 2000-9-1, Department of Computer Science, College of Charleston, http://www.cs.cofc.edu/~mccauley/survey/report1999/, 1 November 2000.

[3] McDonald, Merry and McDonald, Gary, *Computer Science Curriculum Assessment*, Proceedings of the Thirtieth SIGCSE Technical Symposium, New Orleans LA, March 1999.