

#### IV. Curriculum.

*INTENT: The curriculum is consistent with the program's documented objectives. It combines technical requirements with general education requirements and electives to prepare students for a professional career in the computer field, for further study in computer science, and for functioning in modern society. The technical requirements include up-to-date coverage of basic and advanced topics in computer science as well as an emphasis on science and mathematics.*

**(Curriculum standards are specified in terms of semester hours of study. Thirty semester hours generally constitutes one year of full-time study and is equivalent to 45 quarter hours. A course or a specific part of a course can only be applied toward one standard.)**

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

A. Title of Degree Program. Give the title of the degree program under review, as specified on the transcript and diploma:

Transcript: Bachelor of Science, Computer Science

Diploma: Bachelor of Science, Computer Science

B. Credit Hour Definition. One credit hour normally means one hour of lecture or three hours of laboratory per week. One academic year normally represents from twenty-eight to thirty weeks of classes, exclusive of final examinations. Please describe below if your definitions differ from these.

We are on the quarter system, and a quarter credit hour (or unit) represents one lecture hour per week. Our academic year consists of three 10-week quarters; an eleventh week is used for finals. We also offer a 10-week summer quarter.

C. Prerequisite Flow Chart. Attach a flow chart showing the prerequisite structure of computer science courses required or allowed towards the major.

See Attachment.

D. Course Requirements of Curriculum (term by term and year by year)

**Required and elective courses:** In the tables on the following pages, List the courses in the order in which they are normally taken in the curriculum, classified in the appropriate categories. The data should clearly indicate how the program satisfies the CAC/ABET/CSAB criteria for curriculum as prescribed in the current issue of *Criteria for Accrediting Programs in Computer Science in the United States*. These tables are designed for the semester calendar; they may be easily altered for the quarter calendar.

**Required courses:** List courses by department abbreviation (Math, Chem, CS, etc.), number, title, and number of credits. Apportion the credits for each course by category.

**Elective courses:** Designate these courses "elective." If an elective is restricted to a particular category, then tabulate the credit hours in that category and indicate the category in the listing, e. g. "elective—science." In addition, be sure that you have supplied information elsewhere in this document indicating how you ensure that students take the course in the specified category (e. g. advisement, graduation check sheets, etc.). For free electives (i. e., those not restricted to a particular category), list the credits under Other. Use footnotes for any listings that require further elaboration.

**Note:** Individual courses may be split between or among curriculum areas if the course content justifies the split. For example, a discrete mathematics course may have some of its credits under mathematics and some under computer science. In such cases, assign credits to categories in multiples of one-half credit.

**The *Intent* stated at the beginning of this section must be met in order for a program to be deemed creditable. One way to meet the *Intent* of this criterion is to satisfy each one of the Standards listed below. To do this, answer the questions associated with the Standards. If one or more Standards are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the *Intent* is met in some alternative fashion.**

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.





**Core courses:**

Course (Dept., Number, Title)	Category (credit hours)					
	Theo. Found.	Algorithms	Data Structure s	Software Design	Prog. Concepts	Computer Arch.
CS 130 Discrete Structures	3	1				
CS 140 Introduction to Computer Science		1		1	2	
CS 141 Introduction to Prog. and Prob. Solving		1	1	1	1	
CS 210 Computer Logic	2					2
CS 240 Data Structures and Algorithms I		1	1	1	1	
CS 241 Data Structures and Algorithms II		1	2	1		
CS 264 Assembly Language Programming		1			1	2
CS 310 Formal Languages	4					
CS 365 Computer Organization						4
<b>Total Core</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>8</b>

**Total credits: 36****Advanced courses:**

Course (Dept., Number, Title)	Category (credit hours)					
	Theo. Found.	Algorithms	Data Structure s	Software Design	Prog. Concepts	Computer Arch.
CS 301 Numerical Methods	2	1				1
CS 331 Design and Analysis of Algorithms		4				
CS 405 Microprocessor Systems						4
CS 408 Programming Languages					4	
CS 420 Artificial Intelligence	1	1	1	1		
CS 431 Operating System		2		1		1
CS 435 Database Systems	1		2	1		
CS 440 Compiler Design	1			2	1	
CS 463 Undergraduate Seminar (2)						
<b>Total Advanced</b>	<b>5</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>5</b>	<b>6</b>
<b>Total Core and Advanced</b>	<b>14</b>	<b>14</b>	<b>7</b>	<b>9</b>	<b>10</b>	<b>14</b>

**Total credits: 34**

**Elective courses:**

In addition to the above required courses, students must take 20 units of Computer Science Electives, 12 units of which must be from the following list:

- CS 245 Introductory Computer Graphics
- CS 352 Symbolic Programming
- CS 356 Object Oriented Design and Programming
- CS 370 Parallel Processing
- CS 380 Introduction to Computer Networks
- CS 390 Computer Simulation
- CS 441 Advanced Compiler Design
- CS 445 Advanced Computer Graphics
- CS 450 Computability
- CS 460 Secure Communication
- CS 480 Software Engineering
- CS 490 Honors
- CS 499 Special Topics

**Total credits: 20**

**Required core, required advanced, and required electives:**

**Total credits: 90**

**Standard IV-1. The curriculum must include at least 40 semester hours of up-to-date study in computer science topics.**

1. If it is not obvious from the above tables that the curriculum includes at least 40 semester hours (60 quarter hours) of computer science topics, please explain.

See tables above.

**Standard IV-2. The curriculum must contain at least 30 semester hours of study in mathematics and science as specified below under Mathematics and Science.**

2. If it is not obvious from the above tables that the curriculum includes at least 30 semester hours (45 quarter hours) of study in mathematics and science, please explain.

See tables above.

**Standard IV-3. The curriculum must include at least 30 semester hours of study in humanities, social sciences, arts and other disciplines that serve to broaden the background of the student.**

**Standard IV-4. The curriculum must be consistent with the documented objectives of the program.**

3. If it is not obvious from the above tables that the curriculum includes at least 30 semester hours (45 quarter hours) of study in humanities, social sciences, arts, and other disciplines that serve to broaden the background of the student, please explain.

The university requires 71 quarter units of general education. Of these, 52 quarter units must be in the humanities, social sciences, and arts.

**Standard IV-5. All students must take a broad-based core of fundamental computer science material consisting of at least 16 semester hours.**

4. If it is not obvious from the above tables that the curriculum includes a broad-based core of fundamental computer science material consisting of at least 16 semester hours (24 quarter hours), please explain.

See tables above.

**Standard IV-6. The core materials must provide basic coverage of algorithms, data structures, software design, concepts of programming languages and computer organization and architecture.**

5. The core materials must provide basic coverage of the following five areas. Please indicate below the approximate number of hours in the core devoted to each topic. (This material can be gathered from your course descriptions, but it will ease the job for the visiting team if you do this in advance.)

Algorithms \_\_\_14\_\_\_,  
Data Structures \_\_\_7\_\_\_,  
Software Design \_\_\_9\_\_\_,  
Concepts of Programming Languages \_\_\_10\_\_\_,  
Computer Organization and Architecture \_\_\_14\_\_\_.

**Standard IV-7. Theoretical foundations, problem analysis, and solution design must be stressed within the program's core materials.**

6. The following areas must be stressed within the program's core materials. Indicate the course numbers of courses embodying a significant portion of these areas:

Theoretical Foundations:	CS 130, CS 210, CS 301, CS 310, CS 420, CS 435, CS 440
Problem Analysis:	CS 140, CS 141, CS 240, CS 241, CS 331, CS 435
Solution Design:	CS 140, CS 141, CS 240, CS 241, CS 331, CS 435

**Standard IV-8. Students must be exposed to a variety of programming languages and systems and must become proficient in at least one higher-level language.**

7. Typically, to what programming languages and operating systems are your students exposed?

The introductory series of courses in programming and data structures (CS 140, 141, 240, 241) are taught using Java. Many students also learn C++ either through elective

courses or on their own. In most courses beyond the introductory sequence, students are allowed a choice of language.

The Unix platform on Sun workstations is used for the teaching of the introductory courses. In subsequent courses, students may use the Sun computers or may use their own (usually Windows) computers. Some courses are taught using the Windows laboratory.

8. In what computer language(s) do your students become proficient?

In at least the “primary” language—Java. In addition, many students also develop a proficiency in C++.

**Standard IV-9. All students must take at least 16 semester hours of advanced course work in computer science that provides breadth and builds on the core to provide depth.**

9. If it is not obvious from the tables above that your students take at least 16 semester hours (24 quarter hours) of advanced computer science, please explain.

See tables above.

10. List below the advanced areas in which your students may study. Make clear by your use of “and” and “or” and parentheses which areas are required and which may be chosen from (e. g., A and two of (B or C or D)).

See tables above.

**Standard IV-10. The curriculum must include at least 15 semester hours of mathematics.**

11. If it is not obvious from the tables above that your students take at least 15 semester hours (23 quarter hours) of mathematics, please explain.

Computer Science students take a total of 23 quarter units of mathematics.

**Standard IV-11. Course work in mathematics must include discrete mathematics, differential and integral calculus, and probability and statistics.**

12. If it is not obvious from course titles in the above tables, then explain below which required courses contain discrete mathematics, differential and integral calculus, and probability and statistics.

Computer Science students are required to take MAT 114, 115, 116 (first-year calculus), MAT 208 (linear algebra), MAT 214 (calculus of several variables), and STA 326 (statistics for computer science majors), and CS 130 Discrete Structures.

**Standard IV-12. The curriculum must include at least 12 semester hours of science.**

13. If it is not obvious from the tables above that your students take at least 12 semester hours (18 quarter hours) of science, please explain.

Three quarters of physics are required, as are BIO 110 (life science) and CHM 121 (general chemistry) for a total of 19 quarter hours.

**Standard IV-13. Course work in science must include the equivalent of a two-semester sequence in a laboratory science for science or engineering majors.**

14. If it is not obvious from the tables above and from course descriptions and/or your catalog that the science requirement includes a full year (two-semester or three-quarter) sequence in a laboratory science for science and engineering majors, please explain.

The one-year General Physics sequence requires a laboratory each quarter. The General Physics sequence is the sequence taken by science and engineering majors. The General Chemistry course requires a laboratory. General Chemistry is a course taken by science and engineering majors.

**Standard IV-14. Science course work additional to that specified in Standard IV-13 must be in science courses or courses that enhance the student's ability to apply the scientific method.**

15. If it is not obvious from the tables above and from course descriptions and/or your catalog that the remainder of the science requirement is met with science courses or courses that enhance the student's abilities in the application of the scientific method, please explain. (Mathematics, statistics, and courses normally considered part of the computer science discipline should not be included here).

The remaining science requirement is Biology 110, Life Science.

**Standard IV-15. The oral communications skills of the student must be developed and applied in the program.**

**Standard IV-16. The written communications skills of the student must be developed and applied in the program.**

16. Each student's oral and written communications skills must be developed and applied in the program, i. e., in courses required for the major. This information should be included in course descriptions; please give course numbers below.

In addition to the three required courses in Communication in the English Language, all graduates of Cal Poly Pomona must pass a Graduation Writing Test. This test requires students to write an essay on a topic announced at the time of the examination. The essays are graded using a holistic grading system by faculty from various departments in the university. Students for whom English is a second language may substitute a two-quarter sequence of courses, preceded by preparatory courses, for the Freshman English course. No other exceptions to the requirements are permitted. Students who have difficulty meeting the requirements are encouraged to seek assistance; programs are available on campus to meet these needs.

In addition to the General Education courses in Communication in the English Language, University policy requires that every course approved for General Education credit contain a significant writing component. Thus, while the English and Foreign Language Department is responsible for developing and assessing competence in written and oral communication, every program on campus is involved in helping students to acquire and strengthen this competence.

Computer Science courses require written work in the form of program documentation, essay examination questions, term papers, and written homework. Several courses require oral communication: the Undergraduate Seminar course requires students to prepare and deliver a presentation; software design projects in courses may require students to give individual or team presentations of their designs. Students receive feedback in each of these cases; specific corrective actions vary among faculty members and courses. When a term paper is required, the grade for the term paper is a significant part of the course grade. Oral and written communication skills are the focus of the Undergraduate Seminar, and the basis for the grade.

The introductory course, CS 140, Introduction to Computer Science, has a written essay as one of its requirements. The senior level courses CS 420, CS 431, and CS 435 each has a term research paper as a requirement.

**Standard IV-17. There must be sufficient coverage of social and ethical implications of computing to give students an understanding of a broad range of issues in this area.**

17. Social and ethical implications of computing must be covered in the program. This information should be included in course descriptions; please give course numbers below.

CS 140 Ethical and social impacts of computing are addressed as part of developing an understanding of the role of computers and especially that of computer scientists. The required essay in this course is to deal with this topic.

CS 463 Ethical and social issues of computing are the theme of the Undergraduate Seminar, and are to be the basis for the students' presentations and their writing assignments.

CS 420 Consideration of ethical and social dilemmas posed by AI.

CS 431 Issues of security, privacy, and property rights as they relate to operating system functions.

CS 435 Individual and organizational concerns regarding accuracy and privacy of data.

#### E. Course Descriptions.

For each required or elective computer science course that can be counted for credit in the curriculum being reviewed for accreditation, include a two-page or three-page course outline at this point in the self-study. If your documentation does not exactly follow this format, be sure that all of the indicated information (if applicable) is present, and please in any case adhere to a common format for all course descriptions.

Note: The outline format calls for information on the content of the course in the areas of computer science theory, communications skills development and application, social and ethical implications of computing, and problem analysis and solution design experiences. This is not intended to suggest that every course must have some coverage of each of these topics. For a given course, please include the information from a listed area only if the course has significant content in that specific area.

In addition, similar outlines should also be included for required mathematics and science courses taken by computer science students.

The course outline for each required or elective computer science course must also be included in a display of course materials that is available for study at all times during the program evaluation site visit. The course material display must include at least the following for each computer science course that can be counted in the computer science segment of the curriculum being evaluated.

1. Textbook and other required material (e.g., manuals, reference booklets, standards documents, and so forth)
2. Syllabus and course policies
3. A complete set of assignments, tests, and important handouts
4. Samples of graded student work on all assignments, written reports and other documents, and tests. Examples of excellent, satisfactory, and poor student work should be included.
5. If some of the above documentation is online (e. g., in an instructor's web site), please indicate this, and have a computer available at or near the course displays so that the team can view it. Please give here the URL(s) for accessing any such materials:

**URLs given on next page.**

**Course Descriptions may be viewed at the following URLs:**

In Microsoft Word Format

[http://www.csupomona.edu/~cs/accreditation/courses\\_2002.doc](http://www.csupomona.edu/~cs/accreditation/courses_2002.doc)

In Adobe Acrobat Format

[http://www.csupomona.edu/~cs/accreditation/courses\\_2002.pdf](http://www.csupomona.edu/~cs/accreditation/courses_2002.pdf)