



September 1, 1999

CALIFORNIA
STATE
UNIVERSITY,
FRESNO

TO: Brent Auernheimer, Chair
Department of Computer Science

FROM: Brandt Kehoe
Interim Associate Provost

A handwritten signature in black ink, appearing to read "Brandt Kehoe", written over the printed name in the "FROM:" field.

SUBJECT: Class Size in A3, Critical Thinking Courses

The General Education program as recommended by the Senate and approved by the Provost contains the following language in reference to courses in area A3:

All courses must include all of the following elements:

1. Provide theory and practice in reaching factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief.
2. Provide theory and practice in identifying the relationship of language and logic.
3. Provide theory and practice in the structure of informal arguments and development of deductive and inductive reasoning skills with oral or written critiques by the instructor.
4. Provide theory and practice in identifying and distinguishing the most common formal and informal fallacies of language and reasoning with oral or written critiques by the instructor, and
5. Provide theory and practice in identifying and providing examples of the role of critical thinking in society.

As a means of ensuring that these elements can be made integral to these courses and corresponding elements in Areas A1 and A2, the General Education program requires for all courses in Area A:

Courses in Area A must meet the current mode and level standards set for lecture discussion courses. Larger class size may be permitted based on the ability of the course to meet the criteria and by outcome assessment measures (see note 2). Exceptions to the enrollment size limits will be considered by the General Education Committee if they are consistent with the interactive, active learning model of lecture/discussion (C4) courses. Small enrollment may be necessary to achieve the required objectives in some courses, while labs, break-out groups, or other means of providing individual student-instructor communication and feedback may work well in other courses. In some courses, enrollment may be limited by available facilities (i.e. computer stations). While differences in pedagogy and methodology exist between and within instructors,

Associate Provost

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departments, and schools, course (enrollment) size is an important consideration in achieving educational objectives.

Many sections of the courses in A3 which are currently being offered have enrollments and class limits significantly in excess of the C4 class size which is limit 25, breaking point 30. The size limitation was in the GE program as approved and at the time courses were submitted for consideration. It is the expectation of the Committee that lacking the exceptions provided for in the prior paragraph and approved by the Committee, all courses will operate at or near this level. We recognize that this is a transition period but we do expect to see improved compliance in spring 2000, and full compliance by the fall 2000 semester. Full compliance is viewed by the committee as including the level of practice indicated and a class size no greater than 35.

This memorandum is being sent to all programs offering courses in area A3.

Cc: J. Michael Ortiz
Pedro Amaral
Karl Longley

General Education Course Proposal

Proposed Course: C Sci 0001 Critical Thinking & Computer Units 030
Prefix No. Title Science

Department: Computer Science School: Engineering & Computer Science

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3 x; B4___
Breadth: B1___; B2___; C1___; C2___; D___; E___
Integration: B___; C___; D___; International/Multicultural___

Existing Course x; Revised Course ___; New Course ___

Course Included in Current GE Program x

New courses require the Undergraduate Course Proposal form in addition to this form.

Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Prerequisite: intermediate algebra. Overview of the field of Computer Science with an emphasis on critical thinking skills. Problem-solving strategies, algorithm design, and data abstraction. Introduction to hardware, theoretical limitations of computers, and issues arising from the growing role of computers in society. General Education CORE, Critical Thinking.

Enrollment limit per section: C4

Expected number of sections per semester – Year 1 2; Year 3 2

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

Brent Auerhahn 2/23/98
Department Chair Date

Carl E. Longfellow 2/27/98
School Dean Date

Brent Auerhahn 12/22/98
Associate Provost Date

Dennis C. Kuzma 2/24/98
School Curriculum Committee Date

Reds Arnold 12/15/98
General Education Subcommittee Date

Forward Original and TWELVE copies to:
Associate Provost for Academic Affairs, M/S 54

2/5/98

FEB 27 1998

Memorandum

2 September 1998

To: Pedro Amaral, Chair,
General Education Subcommittee

From: Brent Auernheimer, Chair
Computer Science

Subject: A3 Course Proposal – Additional Information

Brent Auernheimer

The attached material addresses the four checklist items given to us in your April memo:

7. The common elements (Attachment 2) and the syllabus (Attachment 3) now include an outline of required topics and typical calendar. Also included are typical reading assignments and the schedule for exercises and exams.

8. The common elements and the syllabus now explicitly state the distribution of the writing requirement across the required elements of the course. We are particularly interested in having the students write in several contexts: informal electronic bulletin-board discussions, graded exercises, and exams.

9. The course schedule now includes explicit reading assignments, and titles of chapters and articles.

10. The common elements and the syllabus explicitly note that a C grade or better is required for General Education credit.

Attachments 2 and 3 immediately follow this memo. The syllabus is a modification of the one being used this semester. We are using this year as a transition from CSci 1 as "GE Critical Thinking CORE" to CSci 1 as GE Area A3.

For completeness I have also included the original Attachment 1, the original proposal cover sheet, and my memo of 16 April discussing the distribution of majors in a typical CSci 1 class.

We are committed, and look forward to, working with the A3 instructors to coordinate "standards and satisfaction" of the guidelines, including the common test bank. Sounds fun, let's do it!

Attachment 2: CSci 1 General Syllabus

Course description

CSci 1 is a three-credit course that develops critical thinking skills through a study of both the formal and informal aspects of computing and its relation to society. Formal reasoning is applied to the design and understanding of logical circuits, algorithms, and other formal processes. Critical analyses are undertaken on numerous social, legal, and ethical issues in computing. The relation between the formal and informal aspects of computing is explored. There are no prerequisites.

General education

This course meets Foundation A3 General Education requirements. For students graduating with the 1998-99 (or before) catalog, this course meets the CORE Critical Thinking requirement. In order to receive General Education credit for this course, students must receive a "C" letter grade or better.

Common information

Every CSci 1 syllabus shall follow University policy. The syllabus shall include: the instructor's name, office, office hours, phone, email, department office, and department phone, required textbooks, schedule, and grading.

Course objectives

After successful completion of this course, students will be able to

- ascertain the logical structure of sentences and identify the conditions under which they are true
- determine whether a proposed deduction involving propositions or categorical statements is valid
- recognize common fallacies of reasoning
- design and analyze simple logical circuits, algorithms, and other formal processes
- appreciate the multifaceted impact of computers on society and critically evaluate claims made in this regard

Course topics and suggested durations

The course is divided into three approximately equal parts. The first part on Logic and Deduction is fundamental and is continually applied and extended in the remaining parts. The topics covered are:

1. Logic and Deductive Reasoning (6 weeks)
 - Sentences, statements, and propositions
 - The logical connectives
 - Categorical statements and syllogisms
 - Quantifiers and predicate logic
 - Sentence translation
 - Argument forms and fallacies

2. Logical circuits, Algorithms, and Formal Processes (4 weeks)
 - Logic gates and circuits
 - Algorithms: state and action
 - Control flow: decision and iteration
 - Analysis of formal processes
3. Social Issues in Computing (6 weeks)
 - Information and intelligence
 - Privacy and encryption
 - Intellectual property and communication
 - Computer risks
 - The computerized society

Course requirements

Examinations. There shall be a midterm examination covering each of the first two parts of the course. Half of the final exam shall cover the last third of the courses. The other half of the final shall be a subset of the question pool common to all critical thinking courses.

Exercises. At least five exercises sets shall be assigned. The exercises shall be directly related to the immediately preceding lecture materials and techniques. Faculty can choose to require students to complete exercise sets on-line.

Writing. The University requires each student to write 2,000 words. Much of the value of writing is feedback and interaction with the professor and other students. Faculty shall assign the 2,000 words across exercises, examinations, and class participation (which may include on-line chat rooms and bulletin boards).

C Sci 1 Course Syllabus

Course Description

CSci 1 is a three-credit course that develops critical thinking skills through a study of both the formal and informal aspects of computing and its relation to society. Formal reasoning is applied to the design and understanding of logical circuits, algorithms, and other formal processes. Critical analyses are undertaken on numerous social, legal, and ethical issues in computing. The relation between the formal and informal aspects of computing is explored. There are no prerequisites.

Instructor Information

Instructor: Dr. J. Todd Wilson **Office hours:** TBD
Email: twilson@csufresno.edu
Office: EE 292
Phone: 278-9138
Lectures: TDB

Course Objectives

After successful completion of this course, students will be able to

- ascertain the logical structure of sentences and identify the conditions under which they are true
- determine whether a proposed deduction involving propositions or categorical statements is valid
- recognize common fallacies of reasoning
- design and analyze simple logical circuits, algorithms, and other formal processes
- appreciate the multifaceted impact of computers on society and critically evaluate claims made in this regard

Course Topics and Materials

The course is divided into three approximately equal parts. The first part on Logic and Deduction is fundamental and is continually applied and extended in the remaining parts. The topics covered are:

1. Logic and Deductive Reasoning (6 weeks)
 - Sentences, statements, and propositions
 - The logical connectives
 - Categorical statements and syllogisms
 - Quantifiers and predicate logic
 - Sentence translation
 - Argument forms and fallacies
2. Logical circuits, Algorithms, and Formal Processes (4 weeks)

- Logic gates and circuits
 - Algorithms: state and action
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 - Analysis of formal processes
3. Social Issues in Computing (6 weeks)
- Information and intelligence
 - Privacy and encryption
 - Intellectual property and communication
 - Computer risks
 - The computerized society

The required textbook for the course is

Sara Baase, *A Gift of Fire: Social, Legal, and Ethical Issues in Computing*, Prentice Hall.

The optional recommended text is

A.K. Dewdney, *The New Turing Omnibus*, W.H. Freeman.

A copy will be on reserve at the library.

In addition to the textbooks there are on-line lecture notes, a few articles available at the Kennel Copy Center, and the course bulletin board (see below).

Coursework and Grading

Examinations. There will be a midterm examination after each of the first two parts of the course. One hour of the final exam will cover the final third of the courses. The second hour of the final exam will be from the question pool common to all critical thinking courses.

Exercises. On-line, "open book" exercises will be given every two weeks, for a total of eight exercise sets. Each exercise will have a two-hour time limit, but may be completed anytime during a specified four-day period. The exercises are directly related to the immediately preceding lecture materials and techniques.

Bulletin board. Students are expected to participate in the on-line class bulletin board. This board is used for class announcements, student questions, and, most importantly, student discussion. These discussions will center around lecture topics, assigned reading materials, and questions posed by the instructor or raised by students.

Writing. The University requires each student to write 2,000 words. Of course, much of the value of writing is feedback and interaction with your professor and other students. In this class this will be experienced as follows: at least 1000 words distributed across the eight exercise sets, at least 500 words of participation in the on-line bulletin board, and 500 words as answers to the examinations.

Grades for the course are computed as follows:

Grades

Bulletin board participation	10%
Exercises	20%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final	30%

The final letter grade will be based on the student's total score according to the following absolute scale:

Range	Grade
88% - 100%	A
75% - 88%	B
62% - 75%	C
50% - 62%	D
0% - 50%	F

In order to receive General Education credit for this course, students must receive a "C" letter grade or better.

Detailed Schedule

SB refers to the chapters in the required text. AKD refers to chapters in the optional text. Titles of articles available at the Kennel Copy Center are quoted.

Date	Lecture Topics	Reading	Events
Week 1	Administration, course overview Sentences, statements, propositions; Simple and complex statements	AKD 3 (systems of logic)	
Week 2	Determining logical form Truth tables and validity	AKD 58 (predicate calculus)	Exercise 1: truth tables
Week 3	Categorical statements, syllogisms Syllogistic validity		
Week 4	Argument forms More examples		Exercise 2: syllogisms and fallacies
Week 5	Argument reconstruction cont.	AKD 5 (Godel's theorem) AKD 34 (satisfiability)	

Week 6	Argument evaluation Fallacies of reasoning		Exercise 3: self reference, satisfiability
Week 7	EXAM Intro to logical circuits	AKD 13 (Boolean logic) AKD 20 (Karnaugh maps) AKD 28 (encoders and multiplexers)	Exam 1: basic logic and reasoning
Week 8	Designing logical circuits State and action	AKD 38 (sequential circuits)	Exercise 4: simple "circuits"
Week 9	Decision and iteration Designing algorithms	AKD 1 (algorithms)	
Week 10	Analyzing algorithms/formal processes cont.	AKD 10 (program correctness)	Exercise 5: program proofs
Week 11	EXAM What is information? What is intelligence?	AKD 44 (cellular automata) SB 1 (unwrapping the gift)	Exam 2: algorithms and formalisms
Week 12	Privacy Encryption	SB 2 (privacy and information), 3 (wiretapping and encryption) AKD 37 (public key cryptography)	Exercise 6: privacy issues
Week 13	Intellectual Property Communication	SB 5 (protecting software and other intellectual property), 6 (constitutional issues)	
Week 14	Computer Risks	SB 4.1-4.4 (can we trust the computer?), 7 (computer crime)	Exercise 7: risks to society
Week 15	The computerized society Artificial intelligence	Chp 9 "Could a machine think?" (Churchlands), "Is the brain's mind a computer program?" (Searle) "Can machine's think?" (Wright)	
Week 16	Artificial intelligence	AKD 6 (game trees) AKD 64 (logic programming)	Exercise 8: game trees
Final Exam			Final exam: societal issues, common questions

Other Policies

- **Attendance.** Much of the material you receive in this course, especially in the first two parts, will come from the lecture, and, for your convenience, I will be making my lecture slides available on the web. However, these slides only contain outlines of my lectures and will not be substitutes for

attending the lectures. Therefore, although I will not be taking attendance, you are nevertheless urged to attend every class meeting.

- **Make up work.** The quizzes have strict activation times that are enforced by our course software. It will not be possible to make them up if you miss them.
- **Cheating and Plagiarism.** Make sure you understand the University policies on cheating and plagiarism. Definitions of these terms can be found in the Schedule of Courses and the University Catalog. Students in violation of these policies will receive an immediate failing grade in this course and have a report to this effect placed in their permanent student record.
- **Students with Disabilities.** If you have a disability, be sure to identify yourself to the University and the instructor so that reasonable accommodation for learning and evaluation within the course can be made. Please contact Services to Students with Disabilities, Library Room 1049, 278-2811.

The above schedule and procedures for this course are subject to change in the event of extenuating circumstances.