Course 309A: Conceptual Structures

Taught by John F. Sowa in the Computer Science Department, Stanford University, in the autumn quarter of 1987. The textbook used was *Conceptual Structures* by J. F. Sowa. Following is an excerpt from pp. 143-144 of the Stanford course catalog for the academic year 1987-88. After that are the student evaluations for this course in comparison to other courses in the School of Engineering.

PRIMARILY FOR GRADUATE STUDENTS

300. Departmental Lecture Series—Weekly presentations by members of the department faculty, each describing informally his or her current research interests and views of computer science as a whole. Recommended for first-year Computer Science graduate students.
1 unit, Aut (Earnest) Th 4:15-5:30

304. Programming and Problem Solving Seminar—Solution of various problems, numeric and symbolic, on computers. Emphasis on the research paradigms of computer science and the development of algorithms that are "beautiful" from various points of view. Limited to and recommended for Ph.D. degree candidates in computer science.
3 units, Win (Staff) TTh 2:45-4

306. Recursive Programming and Proving—Recursive programming using the LISP language and techniques for providing the correctness of recursive programs. Computing with symbolic expressions rather than numbers, e.g., algebraic expressions, logical expressions, patterns, graphs, and computer programs. Pattern matching and syntax directed computation. Preparation for work in artificial intelligence is emphasized. Prerequisite: 106B or 108B, or equivalent ability to program.
3 units, Aut, (Shankar) TTh 2:45-4

309. Industrial Lectureships in Computer Science—Each quarter the department invites one outstanding computer scientist from local industry to give a course in his/her specialty. Lecturers and topics change yearly, hence these courses may be taken repeatedly. This years lecturers are: John Sowa, a member of the IBM Systems Research Institute where he teaches artificial intelligence and does research in computational linguistics; Cynthia Dwork, of IBM Almaden Research Center, works on the theory of parallel and distributed computation; Paul Haley, chief scientist for Inference Corp., one of the designers of ART, worked at Carnegie-Mellon University on several DEC expert systems.

309A. Conceptual Structures—Problems and issues in knowledge representation and the semantics of natural languages. Theory of conceptual graphs. Structure of the lexicon, canonical graphs for English word classes, logical forms for various features, including quantifiers, relative clauses, anaphora, tenses, and contexts. Schemata and their use in word sense determination, metaphor, and definitions by family resemblances. Relationships to Montague grammar, situation semantics, game theoretical semantics, and discourse representation theory. Conceptual analysis as a basis for knowledge engineering. Prerequisites: Knowledge of first-order logic and natural language syntax.
3 units, Aut (Sowa)

309B. New Directions in Distributed Computing—Cryptographic protocols; interactive proof systems; zero knowledge and minimum knowledge proofs; applications of cryptographic and minimum knowledge techniques to distributed computing.
3 units, Win (Dwork)

309C. Rule-based System Architecture—Data-driven and control flow inference engines; the complexity of pattern matching; the Rete Algorithm. Subgoaling: reasoning with simultaneous goals; opportunistic backward chaining; subsumption versus unification. Propositions; semantic properties of relations; the propositional equivalence and logic of frames. Rule independence, evolution and maintenance. Logical deduction; opportunistic and demand-driven implications; open versus closed world assumptions; non-monotonicity, soundness and the asynchronous arrival of information; logical dependencies and the closed-world assumption. Assumptive truth maintenance; monostonic implementations of non-monotonic logic. Efficiency of rule-based systems; data driven "query" optimization; real-time knowledge-based systems; cooperating knowledge-based systems; parallel inference machines.
3 units, Spr (Haley)

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SURVEY OF STUDENT OPINION OF TEACHING
Conducted by Tau Beta Pi for the Stanford School of Engineering

Students are among those who are best qualified to judge an instructor's teaching effectiveness and to offer suggestions that will help improve his/her performance and promote good teaching standards in the University. This information will not identify any student individually. Numerical data will be summarized and given to the Department Chairman and the instructor after the quarter is over. Written comments will be given to the instructor and published for general distribution.

Listed below are several qualities which describe aspects of instructor performance. Rate your instructor on each of these items by filling the circle next to the one statement that best expresses your opinion. PLEASE USE A SOFT (#2) PENCIL.

Instructor's Name:	Course Number and Title:

1. **Organization and Preparation of Course Material**
   - ◯ Exceptionally well organized and prepared
   - ◯ Consistently well organized and prepared
   - ◯ Reasonably organized and prepared
   - ◯ Sometimes lacks organization
   - ◯ Disorganized or unprepared

2. **Explanation of Concepts and Principles**
   - ◯ Exceptionally clear and enlightening
   - ◯ Very clear in explanations
   - ◯ Usually good in explanations
   - ◯ Seldom adds to student's understanding
   - ◯ Often confuses student's understanding

3. **Ability to Create Interest in Course Material**
   - ◯ Stimulates interest to high degree
   - ◯ Usually stimulates interest
   - ◯ Occasionally stimulates interest
   - ◯ Neither stimulates nor reduces interest
   - ◯ Reduces interest

4. **Apparent Knowledge of Material**
   - ◯ Exceptional
   - ◯ Thorough
   - ◯ Adequate
   - ◯ Somewhat lacking
   - ◯ Poor

5. **Enthusiasm in Teaching Students**
   - ◯ Highly enthusiastic
   - ◯ Generally enthusiastic
   - ◯ Occasionally enthusiastic
   - ◯ Shows little enthusiasm
   - ◯ Seems to have no enthusiasm

6. **Responsiveness to Class Difficulty**
   - ◯ Extremely sensitive and responsive
   - ◯ Usually aware and responsive
   - ◯ Sometimes aware and responsive
   - ◯ Responsive when asked
   - ◯ Insensitive or unresponsive

7. **Use of Examples and Illustrations**
   - ◯ Very effectively used to support material
   - ◯ Usually used well
   - ◯ Used adequately
   - ◯ Seldom used effectively
   - ◯ Never used effectively

8. **Motivation of Students**
   - ◯ Inspires extremely strong effort
   - ◯ Inspires strong effort
   - ◯ Inspires adequate effort
   - ◯ Inspires minimal effort
   - ◯ Eliminates motivation

9. **Choice and Use of Reading Material**
   - ◯ Exceptionally well chosen and useful to class
   - ◯ Very well chosen and useful to class
   - ◯ Adequately chosen and useful to class
   - ◯ Contributes little to class
   - ◯ Poorly chosen or detracts from class

10. **Helpfulness of Homework Assignments**
    - ◯ Contributes greatly to understanding
    - ◯ Contributes well to understanding
    - ◯ Contributes adequately to understanding
    - ◯ Contributes little to understanding
    - ◯ Detracts from understanding

11. **Fairness of Tests or Assessment Methods**
    - ◯ Exceptionally appropriate and fair
    - ◯ Very appropriate and fair
    - ◯ Adequately appropriate and fair
    - ◯ Somewhat inappropriate
    - ◯ Inappropriate or unfair

12. **Contribution to thinking skills**
    - ◯ Greatly enhanced my skills in thinking
    - ◯ Helped my skills in thinking
    - ◯ Marginally contributed to my skills in thinking
    - ◯ Not helped my skills in thinking
    - ◯ Confused my thinking

13. **Overall Value of Course**
    - ◯ Exceptionally helpful and enlightening
    - ◯ Very helpful
    - ◯ Moderately helpful
    - ◯ Marginally helpful
    - ◯ Not helpful or useful

14. **Overall Rating of Instructor's Performance**
    - ◯ Excellent
    - ◯ Very good
    - ◯ Good
    - ◯ Fair
    - ◯ Poor

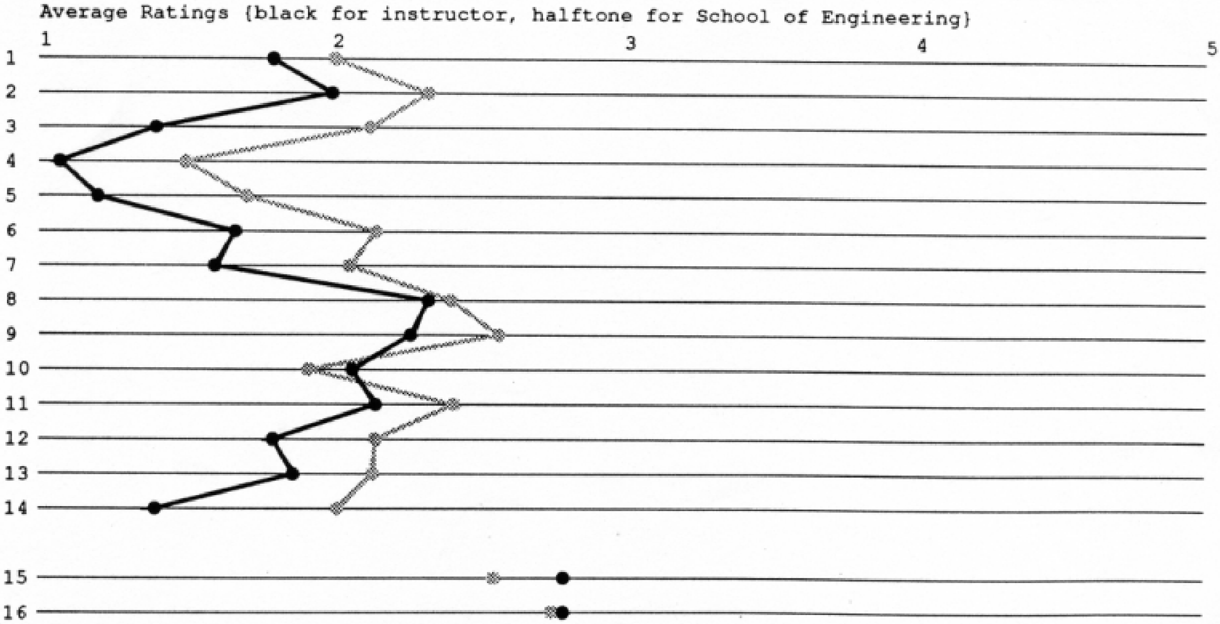
TAU BETA PI

Faculty Evaluation Report
Autumn 1987-88

CS 309 Section 1 SOWA
Industrial Lectureships in Computer Science
15 responding

	Percent responses to rating <1> excellent	<2>	<3>	<4>	<5> poor	no response	your average rating	school average rating	your percentile
1 Organization	27%	67%	7%	0%	0%	0%	1.80	2.01	66
2 Explanations	27%	47%	27%	0%	0%	0%	2.00	2.33	77
3 Creates Interest	60%	40%	0%	0%	0%	0%	1.40	2.13	95
4 Knowledge	93%	7%	0%	0%	0%	0%	1.07	1.50	96
5 Enthusiasm	87%	7%	7%	0%	0%	0%	1.20	1.71	87
6 Responsiveness	47%	40%	13%	0%	0%	0%	1.67	2.15	85
7 Use of Examples	47%	47%	7%	0%	0%	0%	1.60	2.06	86
8 Motivates	13%	40%	47%	0%	0%	0%	2.33	2.41	52
9 Readings	7%	60%	33%	0%	0%	0%	2.27	2.57	64
10 Homework	13%	67%	20%	0%	0%	0%	2.07	1.92	34
11 Fairness	7%	60%	20%	0%	0%	13%	2.15	2.42	69
12 Thinking Skills	33%	53%	13%	0%	0%	0%	1.80	2.15	83
13 Course Value	33%	47%	20%	0%	0%	0%	1.87	2.14	71
14 Instructor Rating	60%	40%	0%	0%	0%	0%	1.40	2.02	87
	most				least				
15 Work Required	7%	7%	87%	0%	0%	0%	2.80	2.56	35
16 Pace	0%	27%	67%	7%	0%	0%	2.80	2.76	50

Average Ratings {black for instructor, halftone for School of Engineering}



TAU BETA PI

Faculty Evaluation Report
Autumn 1987-88

Computer Science

796 responding

		Percent responses to rating <1> excellent	<2>	<3>	<4>	<5> poor	no response	dept average rating	school average rating
1	Organization	19%	49%	23%	7%	1%	0%	2.22	2.01
2	Explanations	10%	38%	40%	8%	2%	1%	2.54	2.33
3	Creates Interest	19%	44%	26%	9%	2%	1%	2.29	2.13
4	Knowledge	44%	45%	8%	2%	0%	1%	1.68	1.50
5	Enthusiasm	38%	47%	11%	3%	0%	0%	1.80	1.71
6	Responsiveness	23%	47%	20%	7%	2%	1%	2.18	2.15
7	Use of Examples	27%	43%	22%	7%	1%	0%	2.10	2.06
8	Motivates	8%	39%	41%	10%	1%	1%	2.58	2.41
9	Readings	10%	28%	35%	21%	3%	4%	2.78	2.57
10	Homework	36%	40%	18%	3%	0%	3%	1.90	1.92
11	Fairness	9%	41%	32%	11%	2%	4%	2.54	2.42
12	Thinking Skills	14%	56%	21%	8%	1%	1%	2.27	2.15
13	Course Value	16%	45%	28%	8%	1%	0%	2.33	2.14
14	Instructor Rating	25%	41%	21%	11%	2%	0%	2.24	2.02
		most				least			
15	Work Required	10%	28%	40%	12%	3%	7%	2.67	2.56
16	Pace	4%	19%	57%	10%	2%	7%	2.87	2.76

Average Ratings {black for department, halftone for School of Engineering}