TO: Office of Student Affairs  
6426 Boelter Hall

FROM: C. Zaniolo, D. S. Parker and R. Muntz, Computer Science  
(Proposers) Computer Science Department

Course No. CS240B  
Title Advanced Data and Knowledge Bases  
Units 4

New Course X  
Revision  
Deletion

Prerequisites CS143, CS240A, or equivalent

Logical models for data and knowledge representation. Rule-based languages and nonmonotonic reasoning. Temporal queries, spatial queries, and uncertainty in deductive databases and object relational databases (ORDBs). Abstract data types and user-defined column functions in ORDBs. Data mining algorithms. Semistructured information.

OBJECTIVES OF THE COURSE:

To expose graduate students to the principles and techniques of data and knowledge representation. To train the students in using said principles and techniques in the design and development of advanced information systems.

JUSTIFICATION FOR PROPOSAL:

This material is fundamental in research and development of next-generation information management systems.

REQUIRED TEXTBOOKS:

Author(s) Title Publisher Publication Date


Selected research papers from the literature.

RECOMMENDED TEXTBOOKS:

Chamberlin, D. DB2 Universal Database Morgan-Kaufmann 1998

New 1/28/99
HOURS PER WEEK REQUIRED OF EACH STUDENT

A full course should involve a total of twelve (12) hours per week (in-class and outside class), and a half-course should involve six (6) hours, or the equivalent. Senate regulation 760 provides that credit be reckoned at the rate of one unit per three hours of work per week per term, or the equivalent. (For laboratory courses a minimum of (2) of these (3) hours must be in the laboratory - UPC, May 17, 1978. TOTAL 12)

USE OF SCHEDULING DATA: Computer Resources Yes ___ NO ___

To be offered in the SU, F, W, SP ______x____, ____________ beginning with the SP Qtr., 2000EVERY YEAR ALTERNATE YEARS

EXPANDED OUTLINE:

Logical models of Data and Knowledge [4 lectures]:
- First-order logic; sentences, rules, derivation/proof;
- Temporal Logic, temporal reasoning and spatial reasoning.
- Expressive power and data complexity of query languages.
- Recursive queries in Object/Relational DBs (ORDBs).

NonMonotonic Reasoning [4 lectures]:
- Implicit negation, and Closed World Assumption;
- Stratified programs, well-founded models and stable models.
- Set aggregates, nondeterminism and uncertainty in logic and DBs.

Spatio/Temporal Reasoning and Uncertainty in DBs [6 lectures]:
- Abstract data types and aggregates in ORDBs.
- Efficient support for temporal queries, spatial queries, and uncertainty in ORDBs.
- Clustering, indexing, query optimization, and related implementation techniques.
- Time-series analysis.

Data Mining: Algorithms and Methods [4 lectures]
- Decision support systems and data warehouses.
- Methods and algorithms for discovering associations, classifications and clusters.
- Database-centric methods, and cache-and-mine techniques.

Semistructured Information and assorted advanced topics
- XML and Query languages for semistructured information.
- Versions and temporal management of XML and SGML documents.
- Advanced topics a la mode.

GRADING BASIS:

30% Midterm;
30% Programming projects;
40% Final exam.
Does this modification affect major or minor field program?

Yes ___X___ No ___X___

Submit major field program sheets with handwritten correction.

This course is recommended to satisfy an elective constraint as indicated below:

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RECOMMENDED

Signatures(s):

___________________________  _______________________________
DEPARTMENT CHAIRMAN        PROPOSER                DATE

___________________________  _______________________________
ACADEMIC POLICY COMMITTEE (CSD) CHAIRMAN PROPOSER                DATE

__________________________  _____________________________
EXECUTIVE COMMITTEE (SEAS) CHAIRMAN INSTRUCTOR IN CHARGE            DATE
Information for the Academic Policy Committee:

(1) Approximately how many sessions of this course will be lectures by the instructor? ____19____

(2) How will the remaining sessions be conducted (e.g. student project presentations, exams, guest lecturers)?

One (Midterm)

(3) What is the intended basis of grading in this course?

The class will be graded on the basis of programming assignments, midterm, and a final exam.

(4) Is this course a standard course of a major or minor field? Yes___X___ No ______
If yes explain:

This course integrates and supersedes CS249 "Deductive Databases and NonMonotonic Reasoning", and CS239 "Temporal Databases," which were offered in previous years, and used for major and minor field requirements (PL&S).

(5) If this is a standard course, has it been evaluated and approved by the major field group as a whole? Yes ___X___ No _____
If yes, which other faculty member(s) have agreed to teach the course in your absence? ___Carlo Zaniolo, Stott Parker, Richard Muntz___

Optional:
(6) Is this a good course, and will you do a good job teaching it? Yes, yes___X___, Yes, no___, No, yes____, No, no_____ 

(7) How hard is it?

Fairly hard.