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SCHOOL OF ENGINEERING UNIVERSITY OF CALIFORNIA
AND APPLIED SCIENCE
COURSE PROPOSAL
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``` Computer Science
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``` (Proposers)
Department
Course No. _CS230A_ Title _Models of Information and Computation_ Units _ 4_
New Course _ x_ Revision _ Deletion _
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TO: Office of Student Affairs Date: ___June 4, 1998___

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    6426 Boelter Hall
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FROM:_D.S. Parker, R. Bagrodia, C. Zaniolo
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Prerequisites CS131 and CS181, or equivalent
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CATALOG DESCRIPTION (Limit 40 words):
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Paradigms, models, frameworks, problem solving; axiomatic systems; domains,
Paradigms, models, frameworks, problem solving; axiomatic systems; domains,
fixpoint theory; induction. Logical models: deduction; proof; models; seman-
fixpoint theory; induction. Logical models: deduction; proof; models; seman-
tics; propositional & first-order logic; logic programming. Functional
tics; propositional & first-order logic; logic programming. Functional
models: equations; combinators; lambda calculus; functional programming. Pro-
models: equations; combinators; lambda calculus; functional programming. Pro-
gram models: Hoare logic; object models; standard templates; design patterns;
gram models: Hoare logic; object models; standard templates; design patterns;
frameworks.
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frameworks.

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OBJECTIVES OF THE COURSE:

To expose graduate students to the principles behind dominant models of information and computation, models that arise in software paradigms and frameworks.

JUSTIFICATION FOR PROPOSAL:

This material is fundamental in both research and development of software and information management systems.

REQUIRED TEXTBOOKS:
\begin{tabular}{llll} 
Author (s) & Title & Publisher Publication Date \\
Davis, R.E. & Truth, Deduction, & W.H. Freeman & 1989
\end{tabular}
Davis, R.E. \begin{tabular}{c} 
Truth, Deduction, \\
and Computation
\end{tabular}
Selected research papers from the literature.

RECOMMENDED TEXTBOOKS:
\begin{tabular}{llll} 
Hennessey, M. & \begin{tabular}{l} 
The Semantics of \\
Programming Languages
\end{tabular} & J. Wiley & 1990 \\
Gamma, E. & Design Patterns & Addison- & 1995 \\
et al. & & Wesley &
\end{tabular}
\(\qquad\)
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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\mathrm{ provides that credit Outside Study
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 _x__
To be offered in the ___, _, _, __ w
_____ beginning with the ___S___ Qtr., 19_99_
EVERY YEAR ALTERNATE YEARS
x
EXPANDED OUTLINE:

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Models, paradigms, frameworks, and problem solving [4 lectures]:
Logical models [6 lectures]:
sentences and wffs; axioms and inference rules;
propositional logic; first-order logic; normal forms;
Functional models [5 lectures]:
expressions, equations, evaluation;
combinators, the lambda calculus;
functional programming.

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    problem solving, models, and paradigms; UML and metamodeling;
    elementary models of information and computation; axiomatic systems;
    domain theory; least fixed point theory; well-founded induction.
    derivation and proof; models and semantics; logic programming.
Program models [5 lectures]:
    program derivation and verification using Hoare logic;
    standard templates; object models; design patterns; frameworks.

GRADING BASIS:

1/2 Programming projects
1/2 Final exam

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Does this modification affect major or minor field program?
Yes _____ No ______

Submit major field program sheets with handwritten correction.

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Information for the Academic Policy Committee:

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(1) Approximately how many sessions of this course will be lectures by the instructor? \(\qquad\)
(2) How will the remaining sessions be conducted (e.g. student project presentations, exams, guest lecturers)?

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

The class will be graded on the basis of programming assignments and a final exam.
(4) Is this course a standard course of a major or
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minor field? Yes__x__ No _

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If yes explain:

This course integrates, and supersedes, a number of courses previously offered by different instructors on different topics:
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232A. Operational Semantics of Programming Languages.
232B. Semantics of Programming Languages.
234A. Correctness Proofs.
235A. Logic Programming and PROLOG.
Elements of the material are also taught in other courses, particularly the data management course sequence. The idea is to form a "core" course in the software area, covering important foundations that underly modern software

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(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? ___Stott Parker, Rajive Bagrodia, Carlo Zaniolo

Optional:
(6) Is this a good course, and will you do a good job teaching it? Yes,yes_____,Yes,no___,No,yes___ No, no___
(7) How hard is it?

Fairly hard.```

