

CURRICULUM PROPOSAL FORM

***DEADLINES:**

REGULAR COURSE PROPOSALS: OCTOBER 23, 1998 FOR FALL, 1999 AND FEBRUARY 19, 1999 FOR SPRING, 2000
SHORT-TERM COURSE PROPOSALS: DECEMBER 11, 1998 FOR FALL, 1999 AND MARCH 26, 1998 FOR SPRING 2000

PROPOSAL TITLE: Advanced Topics of Computing

SPONSOR/S: Nancy Tuckman

DEPARTMENT: Computer Science 0707.522

CHECK ALL THAT APPLY:

UNDERGRADUATE GRADUATE

COLLEGE: LAS

If LAS: History/Humanities
 Math/Sciences
 Social/Behavioral Sciences

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TYPE OF PROPOSAL (Check ALL that Apply)

<input type="checkbox"/> General Education	<input checked="" type="checkbox"/> New Course (NOT Gen. Ed.)
<input type="checkbox"/> <i>New Course in</i> _____ <i>Bank</i>	<input type="checkbox"/> Name Change (Dept., School, Major)
<input type="checkbox"/> <i>Existing course, Add To</i> _____ <i>Bank</i>	<input type="checkbox"/> Changes in Degree Requirements
<input type="checkbox"/> <i>Multicultural/Global Designation</i>	<input type="checkbox"/> <i>Changes Involve Gen. Ed. requirements</i>
<input type="checkbox"/> <i>Writing Intensive Designation</i>	
<input type="checkbox"/> <i>Literature Designation</i>	<input type="checkbox"/> Minor Changes to Existing Courses
<input type="checkbox"/> New Minor/Concentration/Specialization	<input type="checkbox"/> <i>Course is NOT General Education</i>
<input type="checkbox"/> New Major/Degree Program	<input type="checkbox"/> <i>Course IS General Education</i>
<input type="checkbox"/> Short Term Course Proposal	

DEPARTMENT
(SIGNATURE INDICATES APPROVAL)

Nancy Tuckman 2/5/99 Don C. Smith 2/4/99

DEPT. CURRICULUM CHAIR / DATE DEPT. CHAIRPERSON / DATE

COLLEGE CURRICULUM COMMITTEE
DATE OF OPEN HEARING (if necessary) 4-27-99

APPROVED
 NOT APPROVED

COMMENTS:

Nancy Tuckman 2/5/99

SIGNATURE DATE

ACADEMIC DEAN (& GRADUATE DEAN, for New Graduate Programs Only)

APPROVED
 NOT APPROVED

COMMENTS:

[Signature] [Date]

SIGNATURE (Academic Dean) DATE

[Signature] [Date]

SIGNATURE (Graduate Dean) DATE

UNIVERSITY CURRICULUM COMMITTEE

DATE OF OPEN HEARING (if necessary) 4-27-99 (college level only)

APPROVED

NOT APPROVED

COMMENTS:

Annitta Renee 6/30/99
SIGNATURE DATE
(example used)

SENATE

Date announced at Senate ~~3-30-99~~
4-27-99

Voted upon at Senate: Approved Not Approved Date:

EXECUTIVE VICE PRESIDENT/PROVOST

APPROVED

NOT APPROVED If no, reasons are as follows:

STUDENT CREDIT HOURS 3 FACULTY LOAD HOURS 3 EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE): _____

DATE/SIGNATURE EXECUTIVE VICE PRESIDENT/PROVOST

(Signature) 7/21/99

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED _____

HEGIS TAXONOMY & COURSE NUMBER ASSIGNED 0707.532

DATE/SIGNATURE OF REGISTRAR Robert A. Kubat 7/26/99

NOTIFICATION FORWARD:

SENATE CURRICULUM COMMITTEE CHAIRPERSON

DEPARTMENT CHAIRPERSONS

ACADEMIC DEAN(S)

REGISTRAR

SPONSOR(S)

TM
8/16/99

Rowan University
Department of Computer Science

Course Proposal

Advanced Theory of Computing 0707.522

1. Details

- a. Course Title: Advanced Theory of Computing
- b. Sponsor: Nancy Tinkham, Department of Computer Science
- c. Credit Hours: 3
- d. Course Level: Graduate
- e. Curricular Effect: This course will be an elective for students in the Master of Arts in Higher Education program who are specializing in Computer Science. It will also be available as a service course to graduate students in other programs who are taking courses in computer science and related fields.
- f. Prerequisites: Foundations of Computer Science (0707.210) and Calculus II (1701.131); or permission of instructor
- g. Suggested Time, Implementation: Offered once every two years
- h. Resources: The course can be taught with existing faculty, equipment, and library resources.

2. Rationale

Theory of computing is a central area of computer science, providing the mathematical foundation for proving properties of programs, analyzing the efficiency of programs, and determining the limits of what can be computed. Currently, there is no course in the theory of computing available to graduate students. This course will help to fill that gap.

The computer science department already has an undergraduate (senior-level) theory of computing course. This is the graduate counterpart. In practice, the graduate course will frequently be offered concurrently with the undergraduate course; graduate students will be expected to do more work in the course than the undergraduates (for example, graduate students may have to solve \surd problems or be required to research an area and present the results to the class). substantially deeper

Like its undergraduate counterpart, this course presupposes that the student is already familiar with the basic computational models used in theory of computing: finite automata, regular expressions, formal grammars, and Turing machines. This course will study these topics in more depth and may explore additional computational models such as recursive function theory or Post systems.

3. Essence of the course

a. Objectives in relation to student outcome

- Students will understand the important proofs underlying regular, context-free, and recursively enumerable languages.
- Students will understand and be able to use one or more models of computability, such as Turing Machines or recursive function theory.

b. Topic outline

I. Regular Languages: Finite automata, regular grammars, regular expressions

II. Context-Free Languages: Context-free grammars, pushdown automata

III. Computability theory:

A. One or more models of computability, such as: Turing Machines, recursive function theory, phrase-structure grammars, Post systems, or Markov algorithms.

B. Limits of computability

1. Halting problem
2. NP-Completeness

c. Evaluation and grading procedures for students

Students will be evaluated based on a combination of written homework assignments and exams.

d. Course evaluation

The department curriculum committee will evaluate this course.

4. Consultation: Consultation was internal to the department.

5. Additional information

Possible texts include:

Models of Computation and Formal Languages (Taylor, Oxford University Press, 1998)

The Theory of Computation (Moret, Addison-Wesley, 1998)

Introduction to Computer Theory (Cohen, Wiley, 1997)

Computers and Intractability: A Guide to the Theory of NP-Completeness (Garey and Johnson, Freeman, 1979)

6. Catalogue description

Advanced Theory of Computing 3 s.h.

(Prerequisites: Foundations of Computer Science (0707.210) and Calculus II (1701.131); or permission of instructor)

This course builds on the introduction to the theory of computing provided in the course *Foundations of Computer Science*. It discusses finite automata, formal languages, Turing Machines, and computability theory at an advanced level.

Suggested hegis #: 0707.522