

COURSE DESCRIPTION

Department and Course Number: COMP 6200

Course Title: Theoretical Computer Science

Total Credits: 3

Required: No

Prerequisites: COMP 4200

Class meetings per week: 3 hours

Lab meetings per week: hours

Course Coordinator: Dr. Homer Carlisle

Date Prepared: February 13, 2004

Current Catalog Description:

The nature of the recursive sets and recursively enumerable sets. Decidability. Context-sensitive grammars and linear-bounded automata, including closure properties; oracles; reduction; the arithmetic hierarchy; the analytic hierarchy.

Textbooks:

Paun, Rozenberg, Salomaa. 2001. *Current Trends in Theoretical Computer Science, Entering the 21st Century*. World Scientific. ISBN 981-02-4473-8.

Schoning, Pruij. 1998. *Gems of Theoretical Computer Science*. Springer Verlag. ISBN 3-540-64425-3.

References:

None.

Course Objectives:

1. At the conclusion of this course the student will be capable of reading the research literature in the field of complexity theory and formal languages.
2. The student will be familiar with notions of an oracle and a hierarchy of complexity classes above the recursively enumerable sets.
3. The student will understand the reduction of one problem to another.

Prerequisites by Topic:

1. Introductory course in theoretical computer science

Topics Covered: (specify number of hours on each)

1. Review of regular sets, context-free languages, recursive sets (4 hours)
2. Linear-bounded automata (5 hours)
3. Context-sensitive languages (4 hours)
4. Closure properties of NSPACE(n) (4 hours)
5. Oracles (2 hours)
6. Reduction of languages/problems (4 hours)
7. Arithmetic hierarchy (10 hours)
8. Analytic hierarchy (10 hours)
9. Exams (2 hours)

Laboratory Projects: (specify number of weeks on each)

None.

Oral and Written Communications:

None.

Social and Ethical Issues:

None.

Theoretical Content:

Theoretical aspects of computer science form the entire focus and content of this course.

Problem Analysis and Solution Design:

None.

