Rochester Institute of Technology
Rochester, New York

COLLEGE of Computing and Information Sciences
Department of Computer Science

NEW SEMINAR COURSE: 4003-590

1.0 Title: eXtreme Theory **Date**: Jan 7th, 2004
Credit Hours: 4 hours

Prerequisite(s): 1016-265 Discrete Math I or equivalent and programming experience.

Corequisite(s): NONE

Course proposed by: Edith Hemaspaandra, Chris Homan, Stanisław Radziszowski, Ankur Teredesai

2.0 Course information:

	Contact hours	**Maximum students/section**
Classroom	4	20
Lab		
Studio		
Other (specify homeworks, programming projects; term papers; presentations; exams)		

Quarter(s) offered (check)
_____ **Fall** __√__**Winter** __√__ **Spring** _____ **Summer**

Students required to take this course: (by program and year, as appropriate)
None
Students who might elect to take the course:
Advanced Undergraduate students in computing and science.
Related Courses:
Related courses for undergrads: 4003-481 Complexity and Computability, 4003-482 Cryptography, 4003-590 Data Mining, 4003-590 Combinatorial Computing.

3.0 Goals and rationale of the course:

- Introduce students to current topics in the theory of computing.
- Spark interest in further advanced electives and research.
- Introduce students to research practices in computing theory and relevant areas.
- Explain how and why theory matters to all computing by exploring some application areas.
- Improve the students' communication and presentation skills.

4.0 Course description (as it will appear in the RIT Catalog, including pre- and co-requisites, quarters offered)

This course provides a fast-paced, informal look at current trends in the theory of computing. Each two-hour lecture will be dedicated to a different topic and will explore some of the theory as well as practical applications. Sample topics may include: quantum cryptography, small-world phenomena, privacy preserving data mining, and zero-knowledge protocols.

Prerequisites: 1016-265 Discrete Math I or equivalent and programming experience.

5.0 Possible resources (texts, references, computer packages, etc.)

5.1 Research and survey papers and instructor handouts.

6.0 Topics (outline):

Each topic will be allocated a two hour lecture block for discussion. Possible topics include:

- Quantum Cryptography
- Quantum Computing
- Computational Politics
- Small-World Phenomena
- Theory Disasters
- Privacy Preserving Data Mining
- Fractals
- Folding Theory
- Linkage Analysis, Social Networks, Web Archeology

- Primality is in P
- Zero-Knowledge Protocols
- Ramsey Numbers
- Kolmogorov Complexity
- Information Theory
- Coding Theory
- Very-Very Advanced Data Structures
- Integer Lattice Theory

7.0 Intended learning outcomes and associated assessment methods of those outcomes

Students will be able to demonstrate basic knowledge of a variety of current topics in theory of computing. **Assessment: Homework.**
Students will be able to demonstrate in-depth knowledge on a specific topic in the theory of computing. **Assessment: Presentation.**
Students will learn, in a group setting, to investigate theoretical topics. **Assessment: Group presentation and mini-projects.**

8.0 Program or general education goals supported by this course

Not Applicable.

9.0 Other relevant information (such as special classroom, studio, or lab needs, special scheduling, media requirements, etc.)

Smart classroom.

10.0 Supplemental information

Co-listed with 4005-709.
Additional component for the graduate students is a term paper.