

COURSE DESCRIPTION

Course No.	CSC 550	Course Title	Combinatorics on Words
Course Type	Sel. Elect.		
Sem. Hours	3	Coordinator	Francine Blanchet-Sadri

Current Catalog Description:

Introduction to the problems and methods in algorithmic combinatorics on words. Problem areas include periodicity, primitivity, and borderedness.

Textbook:

Algorithmic Combinatorics on Partial Words, Chapman & Hall, CRC Press, by Francine Blanchet-Sadri, 2008.

References:

None

Course Outcomes:

Upon successful completion of this course, a student should be able to:

1. *Understand* the basic theoretical concepts of combinatorics on words: codes, periods, and avoidable sets, and recognize the special partial words related to combinatorial results on partial words. (CO1)
2. *Analyze* algorithms on words and test combinatorial properties of partial words such as avoidability of a two-element set. (CO2)
3. *Design* applets that provide implementation of an algorithm on words.(CO3)
4. *Identify* and discuss the main results of the current research on partial words and classify the proof cases according to their number of undefined positions. (CO4)
5. *Draw* the domino graph of a given set of partial words. (CO5)
6. *Comprehend* and *apply* a number of algorithms such as: the domino technique on words to determine if a finite set of words is a code; the algorithm to transform a partial word into a binary one with the same periodic structure; the Patterson algorithm to find out whether a set is a code; and an algorithm to decide if a given finite set of words is avoidable. (CO6)
7. *Prove* that some problems, such as deciding whether a finite set of partial words is avoidable, are NP-hard by using techniques such as reduction from the 3SAT problem. (CO7)

Prerequisites by Topic:

Students must have

- permission of instructor

Major Topics Covered in the Course:

- Preliminaries on Partial Words
- Primitive Partial Words
- Unbordered Partial Words
- Deciding the Pcode Property
- Correlations of Partial words
- Unavoidable sets of partial words

Estimated Curriculum Category Content (Semester hours):

<i>Area</i>	<i>Core</i>	<i>Advanced</i>	<i>Area</i>	<i>Core</i>	<i>Advanced</i>
Algorithms	1	2	Software design	0	0
Data structures	0	0	Prog. Languages	0	0
Comp Org & Arch	0	0			