

## COURSE DESCRIPTION

Department and Course Number	<b>CS 427</b>	Course Coordinator	<b>Skjellum</b>
Course Title	<b>Bioinformatics</b>	Total Credits	<b>3</b>

### Current Catalog Description

*Introduction to computational methodologies in bioinformatics.*

### Textbook

*Bioinformatics, Sequence and Genome Analysis, by David W. Mount, Cold Spring Harbor Laboratory Press, 2001.*

### References

*Genes VII by Benjamin Lewin, Oxford University Press, 2000.*

### Course Goals

1. *Define bioinformatics*
2. *Learn biology background*
3. *Understand laboratory techniques*
4. *Understand how bioinformatics is useful*
5. *Aspects of bioinformatics*
  1. *To aid lab research*
  2. *in silico research*
  3. *algorithms to aid research*
6. *Familiarity with bioinformatics resources – UAB & others*
7. *Bioinformatics Tasks and related algorithms*
  1. *nucleotide similarity*
  2. *protein similarity*
  3. *pairwise alignments*
  4. *multiple sequence alignments*
  5. *gene finding*
  6. *phylogenetics*
  7. *microarray data analysis*
  8. *RNA structure*
  9. *Proteomics*
8. *Web sites & Databases*

### Prerequisites by Topic

*Algorithms and Data Structures*

### Major Topics Covered in the Course

*Part I: Basic Biology Knowledge*

1. *DNA, RNA, protein, cell structure*

2. *Central dogma, DNA replication, DNA transcription to RNA, RNA translation to protein*
3. *Functions of protein*

*Part II: Overview of Bioinformatics*

1. *Basic Lab Techniques*
2. *Mass Spec Techniques*
3. *Overview of Bioinformatics for CS*
4. *Basic Bioinformatics Tools & Sequence Analysis*
5. *Genome & Human Genome Project*
6. *Microarray Data Analysis*

Laboratory projects (specify number of weeks on each)

*None*

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	_____	<u>2</u>	Computer Organization and Architecture	_____	_____
Algorithms Software Design	_____	<u>8</u>	Concepts of Programming Languages	_____	_____

Oral and Written Communications

*None*

Social and Ethical Issues

*None*

Theoretical Content

*Algorithms (10 hours)*

Problem Analysis

*Understanding the problems to be solved and approaches taken.*

Solution Design

*The purpose of this course is to give CIS students an introduction to bioinformatics, biology and the problems that bioinformatics can address as well as an introduction to the computational approaches used to solve these problems.*