

# Chapter 1.0: Introduction

1.0 Course Plan; references

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Fall 2007

## Course Goals

- Comprehensive introduction to bioinformatics
  - Goal 1: State of the art intro
  - Goal 2: From basics to research
- Focus on
  - Sequence analysis techniques
  - Micro-array analysis
  - Biological networks (systems biology)
- Caveats... ☺read the small letters
  - Rapidly evolving interdisciplinary field
  - “**THE** Textbook” does not yet exist

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## Approximate Schedule

Dates	Chapters
9/4-9/6	Chapter 1: Biology Primer
9/11-9/25	Chapter 2: Sequence alignment (similarity)
9/27-10/2	Chapter 3: Phylogenetics
10/4-10/11	Chapter 4: Hidden Markov Modeling
10/16-10/23	Chapter 5: Micro-array analysis
10/25-10/30	Chapter 6: Bayesian networks techniques
11/1-11/15	Chapter 7: Regulatory networks
11/20-11/27	Chapter 8: Network topology
11/29-12/4	Chapter 9: Metabolic networks
12/6	Chapter 10: Signaling networks

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## Course Assignments & Grading

- Course projects; 3 deliverables
  - Plan
  - Presentation
  - Report
- Assignments (TBD)
- Grading: project deliverables + assignments

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## Course Administration

### ■ Help:

- Instructor: Prof. Y. Yemini (YY)
  - Office hrs: Tu 6-7PM or by appointment
- TA: TBD

### ■ CS academic honesty policy is strictly observed

- <http://www.cs.columbia.edu/education/honesty>

### ■ Books and references

- Web site: <https://courseworks.columbia.edu>
- Older web site: [www.cs.columbia.edu/4761](http://www.cs.columbia.edu/4761)
- Per class

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## Course References: Bioinformatics

- N.C., Jones & P.A. Pevzner, “ An introduction to Bioinformatics Algorithms”, MIT Press.
  - Algorithmic intro; strong on algorithms
- D. Mount, “Bioinformatics; Sequence and Genome Analysis”, 2<sup>nd</sup> edition, Cold Spring Harbor Lab Press.
  - Comprehensive reference book
- I. Eidhammer et al, “Protein Bioinformatics”, J. Wiley.
  - Comprehensive, concise reference book
- R. Durbin et al, “Biological Sequence Analysis”, Cambridge University Press.
  - Strong on probabilistic sequence analysis
- A.M., Campbell, L.J. Heyer, “ Discovering Genomics, Proteomics and Bioinformatics”, Benjamin Cummings.
  - A gem; lots of application examples & hands-on discovery

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## References: Biology Background

- B. Alberts et al, "Molecular Biology of The Cell", 4<sup>th</sup> edition, Garland Science.
- R. Horton et al, "Principles of Biochemistry", 3<sup>rd</sup> Edition, Prentice Hall.
- J.D. Watson et al, "Molecular Biology of The Gene", 5<sup>th</sup> edition, Pearson Benjamin Cummings.
- NCBI Introductory overview:  
<http://www.ncbi.nih.gov/About/primer/index.html>