



Department of Computer Science

College of Computing Sciences

www.cs.njit.edu

NJIT
Computer Science Department
University Heights
Newark, NJ 07102
973.596.3366



Agenda

- Computer Science
- Bioinformatics
- Program Overview
- Resources
- Q/A



Computer Science

- Covers:**
 - System building
 - System architecture
 - Theory and Concepts
 - Design
 - Software engineering
 - Performance



What Is Bioinformatics?

- ❑ New and rapidly growing interdisciplinary field at the intersection of computer science and biology
- ❑ Computer science provides tools to generate, maintain, analyze and utilize bioinformation
- ❑ Computer science is biology's microscope for the 21st century



Computer Science Faculty

(Including Bioinformatics)

- ❑ Faculty have PhDs from some of the world's most prestigious universities.
- ❑ Some faculty have come to NJIT after successful careers at such companies as Bell Labs, AT&T, and IBM, among others.



Faculty Expertise

Students can interact with faculty in areas such as:

- Databases
- Data Mining
- Bioinformatics
- Algorithms
- Software Engineering
- Parallel Computing
- Telecommunications and Networking
- Graphics and Image Processing
- Artificial Intelligence
- Performance Analysis
- Mobile Computing
- Security



Personnel

- ❑ 30 Research/teaching faculty in Computer Science
- ❑ 20 Teaching faculty
- ❑ Full-time professional staff for student advisement



Bachelor of Science in Computer Science (BSCS)

- ❑ Provides students with strong background in both the conceptual and practical aspects of Computer Science
- ❑ Curricula have been developed according to the recommendations of ACM/IEEE
- ❑ Courses are constantly being monitored and modified for relevance.
- ❑ New courses are introduced as warranted by new developments
- ❑ Fully accredited by ABET/CAC



Computer Science Curriculum

<u>Freshman</u>	<u>Sophomore</u>	<u>Junior</u>	<u>Senior</u>
Computing Foundations	The Machine	Disciplinary Depth	Integration
<input type="checkbox"/> Problem-Solving, Programming & Data Structures	<input type="checkbox"/> Language Theory <input type="checkbox"/> Computer Organization <input type="checkbox"/> Operating Systems	<input type="checkbox"/> Logic & automata <input type="checkbox"/> Societal Issues <input type="checkbox"/> DB Design	<input type="checkbox"/> Algorithms <input type="checkbox"/> Software Engineering <input type="checkbox"/> Capstone



CS Curriculum Overview

- ❑ 12 required CS courses
- ❑ 4 CS elective courses
- ❑ 5 math courses
- ❑ 3 science courses
- ❑ 11 elective courses
- ❑ 8 General University
Requirements



Bioinformatics Degree .. A Stepping Stone

- ❑ "Industry's demand for scientists with skills in bioinformatics far exceeds the supply" – Science
- ❑ "Bioinformatics specialists can expect to receive salaries that exceed those ... in comparable computer careers" – Madison Magazine



The Bioinformatics Curriculum

- ❑ A broad and balanced selection of courses drawn from biology and computer science
- ❑ Hands-on experience with cutting-edge software packages and insight into their design



Environment

An environment that gives students the background and skills necessary for entry into today's workplace. This is achieved through:

- ❑ Senior team project working with industry
- ❑ Faculty that works steadily in the forefront of many research areas
- ❑ Interaction with industry and experts
- ❑ An administration focused on teaching, research, and student services



Average Computing Salaries

Occupation Title	Annual Salary
Computer Scientists, Research	\$135,000
Computer Programmers	\$69,040
Computer Software Engineers	\$58,100
Computer Support Specialists	\$47,330
Computer Systems Analysts	\$51,000
Database Administrators	\$88,000
Network and Computer Systems Administrators	\$60,000
Network Systems and Data Communications Analysts	\$52,000

US Dept. of Labor, Bureau of Labor Statistics; 2001 State Occupational Employment and Wage Estimates, New Jersey



Some NJIT Facilities

- ❑ Four year honors experience
(Albert Dorman Honors College)
- ❑ Wireless areas (classrooms, library)
- ❑ A large number of public computers

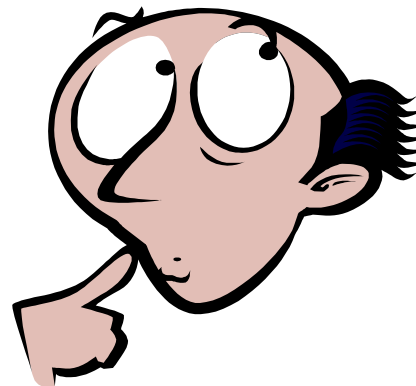
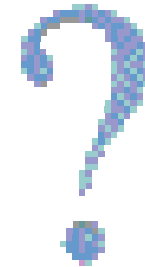


More than BS

- ❑ BS/MS: have 6 credits count for BS and MS; free tuition in 1st semester (if eligible), 5 year program
- ❑ Double majors: have 2 majors completed in 4 years
- ❑ Variety of Minors: select from 25 minors (6 courses each)



Questions or Comments??





A Sampler of Bioinformatics Problems

- Reading the human genome (3 billion units of information)
- Predicting the shape and interaction of biomolecules
- Managing and analyzing snapshot data of cell function from microarrays
- Enabling large-scale drug discovery methods
- Constructing the Tree of Life – the map of relations of common descent of all living things



Computer Science Required Courses

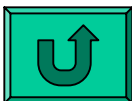
- Introduction to Computer Science I and II
- Computer Organization and Architecture
- Programming Language Concepts
- Intensive Programming Practicum
- Principles of Operating Systems
- Fundamentals of Computer Science I and II
- Computer and Society
- Advanced Data Structures and Algorithms
- Database Design and Management
- Guided Design and Software Engineering
- Senior Project (Capstone)





Computer Science Elective Course Sample

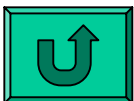
- Multimedia Information Systems
- Introduction to Unix/Linux Operating System
- Systems Simulation
- Computer Vision
- Data Communications and Networks
- Data Mining
- Open Systems Networking
- Web Development
- Object Oriented System Design
- Image Processing
- Security





Computer Science Mathematics Courses

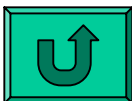
- Calculus I
- Calculus II
- Calculus III
- Probability and Statistics
- Mathematics Elective (e.g. Linear Algebra)





Computer Science Program Electives

- ❑ 4 Computer Science Courses
- ❑ 4 General Electives (Usually used for pre-requisites)
- ❑ 3 Interdisciplinary Studies (Engineering, Science, Mathematics)





General University Requirements

- English Composition
- History
- Philosophy
- Literature
- Economics
- Management

