



 **Computer Science Department**  
**United States Naval Academy**

Offering majors in Computer Science & Information Technology

*“Serving the Navy and Marine Corps Through Excellence in Computer Science and Information Technology Education and Research”*



**Why Computer Science & Information Technology?**

- ◆ Fastest growing segment of our economy
- ◆ Huge demand for people with a high level of computer systems knowledge
- ◆ Military officers well versed in computer systems can apply that knowledge to any mission or training system.
- ◆ High paying and satisfying careers after transition.



**Why Computer Science & Information Technology?**

*Top 10 Best Jobs*  
*Considering growth, pay, stress levels and other factors*

1. Software Engineer	\$80,427
2. College Professor	\$81,491
3. Financial Advisor	\$122,460
4. Human Resources Manager	\$73,731
5. Physician Assistant	\$75,117
6. Market Research Analyst	\$82,317
7. Computer IT Analyst	\$83,427
8. Real Estate Appraiser	\$66,216
9. Pharmacist	\$91,998
10. Psychologist	\$66,359

  
 Best Jobs in America  
 By T. Kalwinski, D. Mosher, J. Paskin, and D. Rosato  
 CNN.com  
 Monday, December 11, 2006



**Why Computer Science & Information Technology?**

NACE Fall 2006 Salary Survey - *Starting Salary*

Discipline (bachelor's degree level)	Average
Electrical/ Electronics Engineering	\$53,300
Mechanical Engineering	\$51,808
<b>Computer Science</b>	<b>\$50,744</b>
<b>Information Sciences &amp; Systems</b>	<b>\$47,182</b>
Civil Engineering	\$46,084
Accounting	\$44,928
Economics	\$44,588
History	\$33,071
English	\$31,385



**That's Nice, But Why Me?**

- ◆ Computer Science and Information Technology are the hottest, most dynamic, and exciting fields there are
- ◆ From cyberspace to multimedia to virtual reality, knowledge bases to knowbots and chatterbots, **Computer Science and Information Technology** are limited only by your imagination.

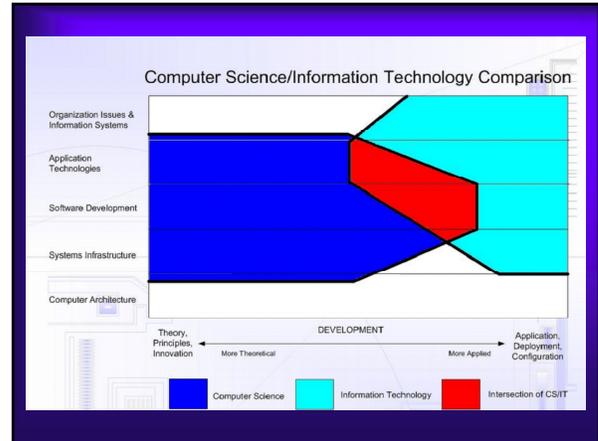


**What's the Difference Between Computer Science and Information Technology?**



## The difference is...

- CS is the traditional computing degree and encompasses algorithms, artificial intelligence, robotics, and graphics.
- IT is a more applied computing degree and encompasses web technology, databases, and computer security.
- **Both** majors provide a strong computing foundation for technical or management responsibilities and/or graduate study.
- **Both** majors allow electives from CS or IT (must satisfy pre-reqs).



## USNA Computer Science & Information Technology

- ◆ Exceptionally qualified complement of military officers and civilian professors
  - **Military**
    - Hold Masters or other advanced degrees
    - Bring fleet experience to students
    - Share real applications of advanced technology in today's Navy, Marine Corps and Air Force
  - **Civilian**
    - Hold Ph.D. degrees
    - Professional experience in teaching and research



## Laboratories

- ◆ Four **PC labs** (MI302,MI392,MI303)
- ◆ Two **UNIX labs** (MI201,MI221)
- ◆ **Robotics lab** (MI223)
- ◆ **Networks lab** (MI300)
- ◆ **Information Assurance lab** (MI316)
- ◆ The newly renovated Michelson Hall provides the CS Department with state of the art facilities, expanded lab facilities, and a student lounge area with wired and wireless internet access.



## Futures in the Fleet

### Where to from here?

Class of '07	CS	IT
<b>NFO</b>	7%	18%
<b>Pilot</b>	22%	28%
<b>Submarine</b>	22%	10%
<b>SWO</b>	19%	31%
<b>Nuc Surface</b>	7%	0%
<b>SEALs</b>	4%	0%
<b>Marine Air</b>	4%	5%
<b>Marine Ground</b>	15%	8%



## Course Requirements

- ◆ **Required Courses CS and IT**
  - IC210 Intro to Computing
  - IC211 Object-Oriented Programming
  - IC220 Computer Organization and Architecture
  - IC221 Systems Programming
  - IC312 Data Structures
  - IC322 Computer Networks
  - IC480 Capstone



## Course Requirements Cont.

- ◆ **Required CS**
  - SI335 Computer Algorithms
  - SI336 Software Engineering
  - SI340 Theory of Computing
  - SI413 Programming Languages
- ◆ **Required IT**
  - IT350 Web & Internet Computing
  - IT360 Applied Database Systems
  - IT430 Info Assurance & Network Security
  - IT440 Systems Analysis & Design



## Course Requirements Cont.

- ◆ **3 Major Electives for CS and IT**
  - One Restricted Elective
  - Two Unrestricted Electives
- ◆ **Some cross-over** between CS and IT is allowed for Unrestricted Electives as long as prerequisites are met.



## Course Electives CS

**One Restricted Major Electives**

SI420	Artificial Intelligence (3-0-3)
SI435	Advanced Software Engineering (2-2-3)
SI411	Operating Systems (3-0-3)
SI440	Database Systems (3-0-3)
SI452	Advanced Computer Architecture (3-0-3)
SI455	Advanced Computer Networks (3-0-3)
SI460	Computer Graphics (2-2-3)
SI462	Advanced Computer Graphics (2-2-3)
SI475	Intelligent Robotics (2-2-3)

**Two Unrestricted Major Elective (all above plus...)**

IT430	Information Assurance and Network Security (2-2-3)
IT460	Human Computer Interaction (2-2-3)
IT470	Enterprise Computing
IT432	Adv Information Assurance and Network Security (2-2-3)
IT452	Adv Web & Internet Systems (2-2-3)
IT462	Adv Database Systems (2-2-3)



## Course Electives IT

**One Restricted Major Electives**

IT432	Adv Information Assurance and Network Security (2-2-3)
IT452	Adv Web & Internet Systems (2-2-3)
IT462	Adv Database Systems (2-2-3)

**Two Unrestricted Major Elective (all above plus...)**

IT460	Human Computer Interaction (2-2-3)
IT470	Enterprise Computing
SI411	Operating Systems (3-0-3)
SI420	Artificial Intelligence (3-0-3)
SI440	Database Systems
SI452	Advanced Computer Architecture (3-0-3)
SI455	Advanced Computer Networks (3-0-3)
SI460	Computer Graphics (2-2-3)
SI462	Advanced Computer Graphics
SI475	Intelligent Robotics (2-2-3)



## Offered Courses

- ◆ **IC210 – Introduction to Computing & IC312 Data Structures**
  - Learn to program and become proficient in C++ in the PC and UNIX environments
    - Microsoft Visual C++
    - GNU C++ for UNIX
  - Plenty of hands-on experience




## Offered Courses

- ◆ **IC322 – Computer Networks**
  - Learn how the “The Net” really works!
  - Program Client-Server applications
  - A course you WILL use in the Fleet!

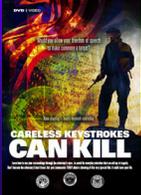




## Offered Courses

- ♦ **IT 430 Introduction to Information Assurance:**
  - Learn how to protect our nation's networks by learning to think like an attacker.
  - This course covers encryption, network attacks and defense, vulnerability analysis and penetration testing.

**Ripped from the Headlines!**  
 U.S. military remains on cyber alert  
 WASHINGTON (AP) Dec. 22, 2009 (AP) — The U.S. military remains on heightened cyber alert ... following at least one intrusion by suspected Chinese military hackers.






## Offered Courses

- ♦ **SI460 – Computer Graphics**
- ♦ **SI462 – Advanced Graphics**
  - Learn the basics of techniques used in movies like **Monster's Inc.** and Games like **Navy Seals** and **Call to Duty 2**








## Offered Courses

- ♦ **SI420 – Artificial Intelligence & SI475 – Intelligent Robotics**
  - Learn how to create intelligent systems and how to make robots perform “useful” tasks




## Offered Courses

- ♦ **IT350 - Web and Internet Computing**
  - Explore web site design and management, scripting languages for web development, server-side and client-side technologies, and emerging standards.
  - With no prior web programming experience, students:
    - create and re-design web sites to improve functionality and appearance.
    - develop interactive applications such as this dynamic web-based “8-puzzle” game




## Internships

- ♦ **Real world experience** with
  - National Security Agency (NSA)
  - Naval Research Labs (NRL)
  - Defense Information Systems Agency (DISA)
  - NATO HQ Brussels, Belgium
  - Naval Warfare Development Center Newport, RI
- ♦ **Accomplishments**
  - Hacked into White House network, exposing vulnerabilities
  - Discovered previously unknown bug in Multicast Dissemination Protocol (MDP)



## Grad School & Scholarships

- ♦ **Naval Postgraduate School (NPS)**
- ♦ **Recent Scholarships to Civilian Schools**
  - Marshall scholarship to London
  - Rhodes to Oxford
  - Pownall to Cambridge
  - Other to Penn, UT Austin, Vanderbilt Maine, Oklahoma, and Minnesota
  - Many VGEPers to Johns Hopkins and others



## 2005 All Service Cyber Defense Exercise (CDX) Champion



This four day exercise challenges each academy's team to design, build, and configure a real-world computer network, then defend against a network offensive operations team (Red Team), composed of NSA and Department of Defense personnel, who are attempting to identify and exploit vulnerabilities on each network.



## Still not sure CS or IT

- ◆ **Stop in** and talk with our faculty (we rarely bite), or ask any CS or IT major in your company about our program.



- ◆ **Note** that you can pick the major that seems most aligned with your interests right now, due to the common IC courses, you can change between CS and IT until the start of 2/C year.



## Capstone Projects

- Satellite Communications and Data Management
- Geographic Information Systems (think GoogleMaps for the Marine Corps)
- Language Cultural Assessment Survey
- Analyst Support for Policy Decision-Making
- Economic Forecasting



## Do You Have What It Takes?

- ◆ Life on the leading edge of technology
- ◆ Fun people
- ◆ Great times
- ◆ Adventure
- ◆ Thrills
- ◆ Excitement\*



\*Okay, you will have to spend a few long nights in the lab!!



## Do You Have What It Takes?

- ◆ Prior programming experience?
  - Did you enjoy it?
  - Did you do well in it?
  - If yes to both, a strong positive sign
- ◆ Can I succeed with no prior experience?
  - YES!
  - Look for some "positive indicators of success"
    - MSAT  $\geq$  620
    - C or better in Calc I
    - CQPR  $\geq$  2.5
- ◆ Need at least a C in IC210 to succeed



## Information Professional (IP) Option

- ◆ **Community Overview:** IPs are the Navy's community of Information Warriors with expertise in information, command and control and space systems.
- ◆ **Accession Options:**
  - Officers are commissioned as a Surface Warfare Officer.
  - When within 6 months of advancement to LT, these officers then have the option to redesignate to 1600 without board action and will be assigned to future duties as a Special Duty Officer (Information Professional).
- ◆ **CS and IT Majors selected for IP Option**
  - 3 selected from last years board (CS majors)
  - 8 projected for this years board



## Our Majors in the Fleet

- ◆ "I can say for sure that the major prepared me for lateral transfer to the IP community."
- ◆ "As CIO I frequently hear my technicians talking about problems and what they think is a solution, and I just shake my head and go "no, that's NOT how it works, let me explain it to you, get you an understanding of what's really going on, and show you how to use that information to fix the actual problem."
- ◆ "The skills developed as a Computer Science student complement the set of skills needed to be an effective leader."



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