Being Digital

New York University
Steinhardt ALT/ECT Undergraduate Offering
EDCT-UE 1010-001

Course Description

This hybrid online-and-classroom course is designed to prepare digital-era students in all fields of study for professional achievement in a technologically sophisticated, global, networked environment. The course is structured around three central elements of "digital literacy" -- 1) human perception and cognition, 2) computers and electronic intelligence, and 2) the network architecture of the digital web. It is not a course in software programming or a skills course in utilizing computers but rather a rigorous intellectual introduction to the fundamental principles on which these technologies are based. There are no perquisites and those from the technologically challenged to techno-geeks are welcome. Students will be introduced to the fundamentals of human attention, how sound waves, light waves and electromagnetic waves work and what computers and routers do. This is a "flipped course" – what would normally be in-class lectures and demonstrations are available online as curricular modules and can be viewed at students' convenience (and re-viewed as appropriate) much like traditional reading assignments. In-person class sections are used for dialog, discussion and Q & A with the instructor.

Requirements

Weekly lecture assignments available online
Weekly reading assignments available online
Weekly class meetings for discussion, Q & A, exercises and quizzes
Supplemental optional reading available online
No textbook or reading packet is required.

Grading

Quizzes 60%
Class projects and participation 10%
Essay 30%

Learning Outcomes

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In addition to an increased capacity to articulate the relevance of technology to career and personal achievement and greater confidence in the students' capacity to master these issues, students should be able to

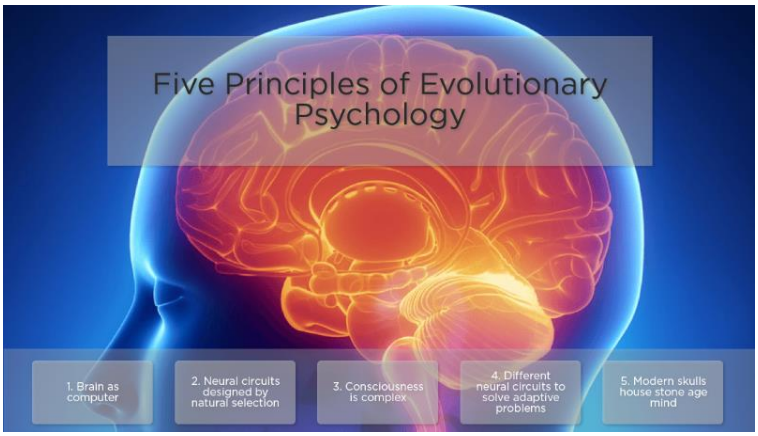
- Identify key processes in the workings of the evolved human cognitive system, especially with vision and hearing; the fundamental processes of machine intelligence; and the architecture of the Internet
- Critically evaluate the impact of digital technologies on the opportunities for professional achievement and social equity.
- Demonstrate critical thinking about the design and social, cultural and economic impact of technology through written exercises and oral communication/class presentations.

Weekly Schedule

Week 1 Introduction

The relevance of "being digital" in professional careers with examples in the arts, education, health professions and management.

Weeks 2 & 3 The Human Cognitive System Is Basically an Analog Computer



Before we address how digital systems work we take a look at human perception and communication. The human brain has an amazing capacity for selective attention and calculation to avoid information overload. We solve the mystery of the "magic number 7' of human perception and find out why humans can naturally perceive light waves and sound waves but not radio waves. It turns out that humans are particularly attentive to social signals and signs.

Week 4 & 5 Language and the History of Human Communication

From smoke signals to the Internet, what technologies did we invent to capture sound and light waves and convey information over distances. What would a high fidelity sound system designed for canines look like? Although that may seem like a flippant little puzzle it has been shown be a useful pedagogical device for getting students think afresh about media technologies. How is it possible that we perceive smooth motion in 24-frame-per-second motion pictures? Do Eskimo–Aleut languages really have 38 unique words for snow? What was George Orwell's insight into the relationship between language and understanding?

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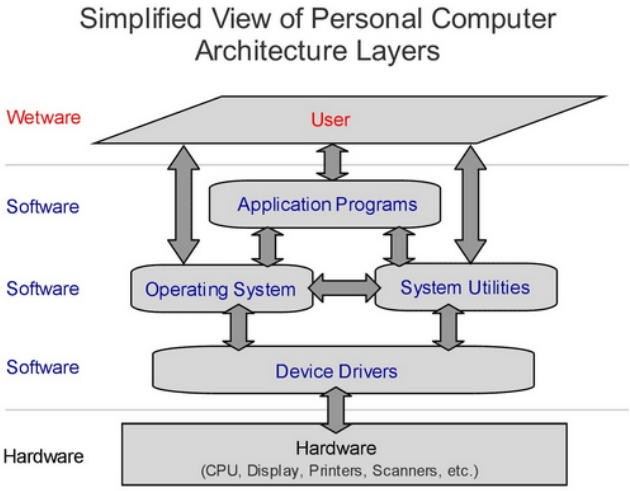
Weeks 6 & 7 Going Digital

Digital technologies, it turns out, do a much better job at accurately capturing, storing and transmitting information. But most importantly digital "intelligence" allows us to locate and manipulate information.



Weeks 8 & 9 The Miraculous Computer

The key to that intelligence is the "logic gate" the key to how computers process information. The transition from analog computers during WWII to the modern computer architecture of today's laptops and smartphones. The secret of "Moore's Law" of the exponential growth of computer power and speed. The evolution of programming languages and operating systems.

Weeks 10 – 12 The Architecture of the Internet

It turns out that the public Internet was something of an accident – certainly a happy accident from most points of view, arising from military research during the Cold War.

For many of us the Internet is something of a black box. We type search terms and all sorts of web pages pop up. Even many of those who consider themselves web-savvy can benefit from some review of how the Internet Protocol was designed and how it actually works. Digital privacy issues are reviewed.

Weeks 13 & 14 Being Digital -Next Steps

Reviewing what we have learned, students compare the human brain, the computer and the Internet each as an information processing system. Class time will be used to allow students to compare notes on what they have learned and their various strategies for putting that knowledge to work.

Sample Readings -- Selections from:

Blum, Andrew (2012). Tubes: Behind the Scenes at the Internet. London, Viking.

Cosmides, Leda and John Tooby (1997). Evolutionary Psychology: A Primer. University of California, Santa Barbara, (abridged).

Dix, Alan, et al. (2003). Human-Computer Interaction. Upper Saddle River NJ, Prentice Hall.

Foehr, Ulla G. (2006). "Media Multitasking among American Youth: Prevalence, Predictors and Pairings ".

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Harris, William and Craig Freudenrich (2013). "How Light Works" howstuffworks.com.

Lieberman, Matthew D. (2013). Social: Why Our Brains Are Wired to Connect. New York, Crown.

Miller, George A. (1956). "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information." Psychology Review.

Negroponte, Nicholas (1996). Being Digital. New York, Knopf.

Palfrey, John and Urs Gasser (2008). Born Digital: Understanding the First Generation of Digital Natives. New York, Basic.

Reeves, Byron and Clifford Nass (1996). The Media Equation : How People Treat Computers, Television, and New Media Like Real People and Places. New York, Cambridge University Press.

Spraul, V. Anton (2012). Think Like a Programmer: An Introduction to Creative Problem Solving. San Francisco CA, No Starch Press.

Von Neumann, John (1958). The Computer and the Brain. New Haven, Yale University Press.

Zittrain, Johnathan (2008). The Future of the Internet and How to Stop It. New Haven, Yale University Press.

Ever wondered —

- **How a website you are visiting knows who you are?**
- **How Google calculates which websites to show you first?**
- **Where Siri gets her smarts? Is it anything like human cognition?**
- **What's the difference between an app and a computer program?**
- **How to take control of your online identity?**