

# **CS 10100 Digital Literacy**

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# Motivation

In the 21st century, every educated person should understand the fundamentals of digital computers and digital communications

Since we have the best Computer Science department in the world, every graduate of Purdue University should understand how computers work and how computers and the Internet affect their lives

For some time, universities have talked about having a common Computing course for all students

# Motivation

Some students may never need to do "programming"

But, everyone will have continual contact with computers, smart phones, networks, and the Internet throughout their life

We have no permanent course that can accomplish this

All our courses require some amount of programming

A Digital Literacy class can accomplish this for non-Science, non-Engineering students

# Digital Literacy class

Profs. Douglas Comer and Buster Dunsmore have created such a class

There will be no programming in the class

Instead, it is a comprehensive introduction to the digital world -- concepts, vocabulary, and situations that students are likely to encounter

# Digital Literacy class

The course removes the mystery and dispels myths about smart phones, computers, and the Internet

It concentrates on practical consequences of how computing affects students' lives

# Timeline

Fall 2014 -- We developed course materials

Spring 2015 -- We have worked with 6 undergraduate CS students and 6 graduate CS students to review course content, quizzes, assignments, and exams

Fall 2015 -- Profs. Comer and Dunsmore will jointly teach this course to approximately 60 students from Liberal Arts, Education, and Health and Human Sciences

# Topics We Will Cover

What it means for technology to be digital

The major components in a computer

What a computer programmer does

How computers are used in ways you might not suspect

The meaning of terms like pixel and gigabyte that vendors use

How applications work

# Topics We Will Cover

Digital photographs, digital videos, and digital music

What a database is and what a database administrator does

Artificial intelligence and its capabilities

How the Internet works



# Topics We Will Cover

Internet services and how remote access is possible

How search engines find web documents quickly

What it means when information is “in the cloud”

Computer security

# What Students Will Learn

Important fundamentals

Vocabulary

A conceptual understanding of what's behind the curtain and consequences for users

How the Internet is constructed and why the approach is flexible and powerful

How the digital world is changing and what it means for you

# What We Will NOT Cover

Computer programming

Computer design and engineering

Mathematics and mathematical analysis

Irrelevant details and complexity

# How Computing Affects Their Lives

**The course will answer many questions including the following:**

How to decide the disk size needed when purchasing a computer or smart phone

Why smart phones, desktop, and laptop computers have more than one processor (such as dual-core and quad-core devices)

Why computers are embedded in appliances and automobiles

# How Computing Affects Their Lives

What a computer does when you save a document

Why, if someone acquires an Internet service that is 10 times faster than their current service, it is unlikely that web pages will load 10 times faster

When you use the Internet to communicate with a person who is halfway around the world, how the information travels between your computer and theirs

When you upload a video to a cloud service (e.g., YouTube), where the video is stored

# How Computing Affects Their Lives

Why a computer may be able to fool you into thinking a human is really answering your questions

Whether it is possible for a computer to control a car and navigate it through traffic on an actual highway

How you can tell whether it is safe to click a link or not

# How Computing Affects Their Lives

Whether, if a new virus appears, the virus protection software on your computer will prevent the virus from infecting your computer

If your bank's URL begins with "https", how this protects your communication with the bank

# Outline

## **Week Contents**

- 1 Course Overview -- Why study the digital world?
- 2 The Malleable machine -- a computer can be changed through programming
- 3 Digital Information: Representation and Storage -- the reason for binary
- 4 The Concept of Programming -- specifying steps, sequence, repetition, and choice
- 5 Computers Everywhere (The Internet of Things) -- embedded systems, smart phones
- 6 Computers that Perform Simultaneous Computations
- 7 How Apps Work



# Outline

- 8        Structured and Unstructured Data -- what is in a database
- 9        Digital Audio, Graphics, and Video
- 10       Computer Networks and the Internet
- 11       Internet Services: World Wide Web and Sharing Services
- 12       Network and Internet Performance and Real-Time Services
- 13       Artificial Intelligence -- speech recognition, natural language processing
- 14       Cloud Computing -- processing and storage
- 15       Security and Privacy -- encrypting information, passwords, virus software

# Assignments

Each week students will be given several assignments that will require them to learn more about and/or elaborate on things they learn in class

Module 9 -- Digital Audio, Graphics, and Video

Assignment question: Explain what happens when you zoom in on an image that has been produced by a megapixel camera and then compare that to what happens when you zoom in on an image that has been produced by a gigapixel camera.

# Assignments

Module 15 -- Security and Privacy

Assignment question: Research the December 2014 targeted attack on Sony. Explain how lax physical security and lack of malware detection made this possible.