

# **Introduction to Computer Science**

**2022/23**

**Friday-12:00 PM**

**Friday-1:00 PM**

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Office Hours: By Appointment Only

## **I. Rationale:**

Cell phones, email, websites, and electronic banking are becoming common and, in some cases required, for a person to live in today's world. It is important to teach our youth how computers work and how they can help, or harm, our spiritual life.

## **II. Course Aims and Outcomes:**

### **A. Aims**

This class will introduce the students to the world of computer science. It will explore the hardware, software, and user interfaces that they encounter each day. The students will learn the difference between different operating systems, networking, storage, digital security, and social media sites. This class will enable the student to make informed decisions when using digital devices and interacting on-line. It will also act as a starting point for those students who want to pursue a career in computer science by introducing them to information security, networking, storage, email, web hosting and design, and mobile computing.

### **A. Specific Learning Outcomes**

By the end of this course, students will have an in-depth understanding of computer science and its role in their lives. They will know what a cookie is and how it affects their online browsing experience. They will understand what SSL is and why it is needed for a secure on-line experience. This class will teach them the hardware that runs their electronic devices, the software that runs on the hardware, and how that software helps contribute to an on-line digital profile that follows them wherever they go. Ultimately, the student will be empowered to make intelligent and informed decisions about their digital purchases and online behavior.

## **III. Format and Procedures:**

The class will be held once a week. Information will be delivered digitally and discussed in the virtual classroom. Class homework will include research assignments where students pick an item or technology to research before the next class session. An example of this would be where the student inspects their favorite web site and determines what level of security the site uses.

They will learn how to find who owns the web site and where it is geographically located. The student will record their findings on a worksheet and submit it to the instructor for credit.

#### **IV. My Assumptions**

It is understood that the student will have access to a personal computer, the Internet, and modern electronic devices such as a cell phone, tablet, and television. The student should also have a basic understanding of common computer terms such as website, web address, email address, storage, keyboard, and mouse. Above all, the student should have a desire to learn and explore technologies that they are unfamiliar with.

#### **V. Course Requirements:**

1. Prerequisites:
  - The student should be comfortable with operating a computer, accessing web sites, following instructions step-by-step, and recording their findings.
2. Class attendance and participation policy:
  - Students will contact the instructor at least 7 days prior to a planned absence.
  - Each student is allowed 2 planned absences and 1 unexcused absence.
3. Course readings:
  - Required text(s): There are no required textbooks for this class. Students will be provided digital copies of articles on the topic of that week. Students are expected to read the material thoroughly and contact the instructor if they encounter a description that is unclear or confusing.

#### **VI. Expectations for Parents**

- Set aside a calm, quiet, distraction-free space for your child(ren) to work every day.
- Ensure virtual learning equipment is available and charged.
- Establish routines and expectations and a basic schedule for completing classwork.
- Help students ‘own’ their learning.
- Check Edmodo for communications from teachers and help students print off resources that are provided.
- Stay abreast of teacher feedback in the form of grades or other messages.
- Proctor tests, quizzes, or other assessments as scheduled by the teacher. Parents ensure academic integrity because they are on the “live” side of the screen.
- Communicate with teachers regularly via email or Edmodo regarding any questions or issues that arise.
- If your child is having trouble completing work, email teachers to schedule a time for an online meeting.
- Provide access to the electronic devices and materials for the student.

## VII. Grading Procedures

Grades will be weighted on the following scale:  
Class participation and weekly worksheets – 50%  
Mid-term - 15%  
Final Project – 35%

## VIII. Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work. [Optional: For this course, collaboration is allowed in the following instances: list instances.]

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. One great way to assess what you know is to teach the idea to a peer! You may also work together on problem sets and give "consulting" help to or receive "consulting" help from your peers. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in any form (e.g. email, Word doc, Box file, Google sheet, or a hard copy). Assignments that have been previously submitted in another course may not be submitted for this course.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam and may lead to failure of the course and University disciplinary action.

## IX. Tentative Course Schedule

(May change to accommodate guest presenters & student needs)

Topics	Readings to be discussed	Assignment
Computer Storage	Volatile vs. non-volatile memory. Storage types (NVMe, USB, eMMC, HDD, SSD). Storage Encryption. Shared storage (cloud, network). Portable storage. File systems.	
Computer Processing	Processor types (32-bit vs 64-bit, x86 vs. ARM). Processor efficiency (speed-stepping, heat, power draw). Multi-core (SMP) computing.	

Display Types	Touch screen (LCD, IPS, OLED). External displays (DVI, HDMI, DisplayPort, wireless broadcasting)	
Operating Systems	Linux, Windows, Mac OS, Android, iOS. Begin exploring the user interface for each type. Compare and contrast interfaces.	
Designing for Humans	The concept behind the Norman Door and how humans interact intuitively	
Cloud Computing	Discuss the fundamentals of the cloud and how do we use it every day. Information sharing between platforms. How cloud computing differs from local computing.	
Databases	How data is stored in databases. Normalized forms. MS SQL, MySQL, PostgreSQL, T-SQL, ODBC connections. Data redundancy and replication.	
Web Pages	HTML, Java, ASP, and other coding languages. Discuss how web pages interact with the user and how the user interacts with the web page.	
Online Safety	Discuss security features like SSL, DKIM, end-to-end encryption, secure mail, SPAM, password complexity, MFA, and phishing tactics. Social engineering. Case study on hacker Kevin Mitnick.	
Social Media	Discuss how social networking sites work. Discuss how we interact with the sites and how they interact with us.	
Technology and Finance	Bitcoin, NFT, online trading, online banking, Google Pay, Apple Pay, electronic transfers, NFC and wireless payments.	

## **X. Additional Resource Readings (optional)**