

**TITLE: Computer Science**  
**COURSE NUMBER: Com 100**  
**GRADE LEVEL: 9 - 12**  
**LENGTH OF COURSE: 1 year**

**MAJOR CONCEPTS:**

The main goal of this course is to provide students with an introduction to the principals of computer science and its place in the modern world. Students will be introduced to the behavior, language, and skills of a computer scientist. It will provide students with general knowledge about computer hardware, software, and various languages, along their impact on the modern world. Students taking this course will reach a level of comfort in using a computer and understand that the computer is not a magic box. Students will learn the basic structure of a computer, how it works, and how a user can take advantage of the technology available to them.

The topics covered in this course are as follows:

- Computer Hardware
- Data representation and abstraction
- Algorithms
- Creating Apps with Google App Inventor
- Programming with Python
- Programming and creating with Arduino
- Ethical and Social Issues
- Careers in Computer Science

**EVALUATION TECHNIQUES:**

Student progress and understanding will be evaluated through a combination of tests, examinations, written and practical assignments, individual and group projects, with consideration given to homework completion and class participation. Class participation includes:

1. Arriving to class on time (being late to class 3 times will result in losing 1% from your participation grade)
2. Arriving to class with the required materials
3. Activity taking part in all class activities and discussions
4. Completing Homework and projects on time

**GRADE SCALE:**

1 <sup>st</sup> & 3 <sup>rd</sup> Quarter:		2 <sup>nd</sup> & 4 <sup>th</sup> Quarter:	
In-class-work:	30%	In-class-work:	30%
Assignments:	30%	Assignments:	30%
Quizzes/Tests:	20%	Tests:	10%
Projects:	10%	Projects:	10%
Participation:	10%	Participation:	10%
		Midterm/Final:	10%

**OBJECTIVES:**

Upon completion of the course, students will be able to:

**Computer Hardware and Data Representation**

- Identify and define the functions of the hardware components of a computer
- Describe the interaction of the various functional components of the computer
- Explain how digital data is represented by abstractions at different levels in a computer
- Explain how data is represented, stored, and transmitted on a computer
- Count in binary and convert between decimal and binary numbers
- Define abstraction and give cross curricular examples

**Algorithms - Problem Solving the Computer Science Way**

- Name and explain the steps used to solving a problem
- Solve a problem by applying various problem solving techniques

- Express a solution using standard design tools
- Determine if a given algorithm successfully solves a stated problem.
- Calculate the number of steps required to execute a given algorithm
- Write algorithms that use simple and complex logic statements (relational operators and Boolean operators)
- Describe selected searching and sorting algorithms
- Analyze selected searching and sorting algorithms
- Write an algorithm that uses mathematical functions
- Apply simple graph concepts in problem solving
- List activities in which humans excel over computers and activities in which computers excel over humans
- Describe at least one problem computers cannot solve

### **App Inventor**

- Create an event-driven application and demonstrate an understanding of event procedures
- Demonstrate algorithm design as a problem-solving strategy
- Develop an algorithm for implementation in a program
- Use App Inventor projects to explain how abstractions are used in computation or modeling
- Demonstrate the use of decision structures to control the flow of a program
- Write compound Boolean expressions

### **Python**

- Describe and implement computationally intensive problems.
- Name the different phases of the software development process.
- Use a software process model (such as the waterfall, RAD, incremental, or XP) to solve a problem.
- Complete a project as a software design team with assigned roles and responsibilities for each member

### **Arduino**

- Identify the basic parts of the Arduino IDE
- Identify the basic parts of Arduino board
- Identify and explain the various electronic hardware involved
- Create computational hardware artifacts that are programmed using the programming language Arduino C
- Explain how the context in which a computation hardware artifact is used determines the correctness, usability, functionality and suitability of the artifact