LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING, AND COMPUTER SCIENCE

MAC100 Computing Fundamentals
3 hours lecture, 3 credits

Pre-/Co-requisites: ENG099 or English proficiency

Catalog Description:
This course introduces students from any non-CS major to the fundamental concepts of computing, technical innovations, and social issues that are at the heart of computer-based technologies. Students are introduced to the myriad uses of the Internet, cloud services, social media, other computer applications designed to connect physical and digital worlds.

Instructional Objectives:
1. Familiarize students with the principles of computing that are at the heart of computer science.
2. Introduce students to computational thinking in scientific problem analysis and solution development.
3. Reinforce students' ability to apply computing tools to analyze problems and develop solutions.
4. Familiarize students with logical relations in decision making processes.
5. Introduce students to data storage, processing, and visualization procedures in computer systems.
6. Familiarize students with the basic methodology of algorithm design in order to process input data and achieve problem solution.
7. Reinforce student use of generic programming languages that allow algorithms to be executed on the computer.
8. Enable students to identify computing problems in their own disciplines and solve these problems using the knowledge and skills studied in this course.

Performance Objectives:
1. Gather and analyze information about applications and implications of computing in modern society.
2. Evaluate and explain the impact of computational thinking on scientific problems.
3. Demonstrate how to use computing tools to analyze problems and develop solutions.
4. Apply logical calculus in decision making.
5. Explain the principles of data storage, processing and visualization.
6. Interpret and solve scientific problems by means of algorithmic design.
7. Carry out computer algorithms using generic programming languages.
8. Identify and analyze computing problems in their fields of interest, and solve them by means of well-reasoned oral and written arguments reaching evidence-based conclusions.

Student Learning Objectives: This course fulfills the Pathways common core with the following student learning objectives:

1. Gather, interpret, and assess information from a variety of sources and points of view.
2. Evaluate evidence and arguments critically or analytically.
3. Produce well-reasoned written or oral arguments using evidence to support conclusions.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.

Textbook:
Fluency with Information Technology: Skills, Concepts, and Capabilities, Lawrence Snyder, 7th edition, Pearson, 2017, ISBN 0134448723.

Grading Standards:
-- Homework (4 @ 5% each), 20%
-- Computer Assignments (4 @ 5%), 20%
-- Tests (2 @ 15%), 30%
-- Project, 30%

Academic Integrity:
This class will be conducted in compliance with LaGuardia Community College's academic integrity policy.

Attendance:
The maximum number of unexcused absences allowed is 15% of the total class meetings (about 7 hours). Unexcused absences beyond this maximum will result in a grade of WU or F.

Comments:
The grading standards listed above and the contents listed in the course outline are both subject to modification by the instructor.

COURSE OUTLINE

Week	Topic	Assignment Example
Week 1	Introduction to computing and information technologies (computer operations, human-computer interaction, networking, cloud services, operating system, script, HTML, etc.)	

Week 2	Privacy and security issues in digital society, ethics and globalization	HW1: Investigation of a security problem in computing, resulting in 2 page paper exploring pros and cons of issue.
Week 3	Data storage, processing, and visualization on computer systems	
Week 4	Applying computing tools to data processing on computer systems Test#1	Computer Assignment #1: Exercise on applying computing tools to data processing on computer systems.
Week 5	Binary data format and boolean expressions used to represent logical relations for decision making	HW2: Understanding computer science principles underlying matters of public concern, through documented computing experiment and result interpretation.
Week 6	Problem analysis and abstraction, basic components of algorithm, data input and output	Computer Assignment #2: Exercise on evaluating evidence and arguments critically.
Week 7	Flowcharts and pseudo-code used for algorithm description	HW3: Applying computer science concepts and methods in problem solving, with algorithm described in flowchart or pseudo-code.
Week 8	Online research, discussion on computing problems in field of interest, course project beginning	Course Project: Analyzing and solving computing problem in discipline, project implementation reported in well-reasoned written and oral presentation using evidence to support conclusions
Week 9	Impact of computing technologies and scientific discoveries on the contemporary world Test#2	Computer Assignment #3: Exercise on articulating and evaluating the impact of computing technologies and scientific discoveries on the contemporary world
Week 10	Programming languages and development environments, discussion on course project	Computer Assignment #4: Exercise on articulating and evaluating the empirical evidence supporting a scientific theory.
Week 11	Introduction to programming basics, math expression, conditional statement, selection statements, iteration	HW4: Using computing tools in problem analysis and solution development, detailed in lab report including program design and experiment procedure.
Week 12	Large scale algorithmic program solutions, program execution, debugging and testing	
Week 13	Presentation of projects	Project report