Computer Science
Grade: 10

COMP 403– 404 Computer Science
> 0.5 credits per semester
> 3 days per week; 2 semesters
> Taught in English

This is a **required course for all 10th grade students** in both the Mexican and/or U.S. diploma program. In this class students will be introduced to a high level programming language like C++. Students will produce programs using the C++ built-in data-types on variables and constants, will perform calculations and assignments in C++, will draw a program's flowchart, will write a program's pseudo code, will write a program's C++ code using decision-making statements, will control a program's flow using iteration statements, and will compile, link and execute a program to verify its correct implementation while applying good programming style guidelines.

Textbook: None
Prerequisite: COMP 300

Benchmark Code – Subject: Computer Science = CS
Strand 1= Operating the Computer
Strand 2= Keyboarding
Strand 3= Word Processing
Strand 4= Graphics
Strand 5= Internet/Networking
Strand 6= Multimedia
Strand 7= Spreadsheets
Strand 8= Databases
Strand 9= Authoring Software

Standards
1.- The student understands basic technology operations and concepts.
2.- The student uses technology responsibly and ethically.
3.- The student uses technology to communicate effectively and creatively.
4.- The student uses technology for thinking, learning, and producing real world situations.
5.- The student uses technology for research, problem-solving, and decision-making.

Code: Subject.Grade.Strand#.Standard#. Benchmark#
Example: CS.10.9.5.3 – Computer Science, Tenth Grade, Strand 9, Standard 5, Benchmark 3

Strand 9: AUTHORING SOFTWARE

Standard 5: The student uses technology for research, problem-solving, and decision-making.

Benchmark Code	Benchmark
CS.10.9.5.1	The student will define common programming technical terms.
CS.10.9.5.2	The student will list the steps of the methodology for program development.
CS.10.9.5.3	The student will explain a C++ program structure including comments and *main*( ).
CS.10.9.5.4	The student will interpret the meaning of special symbols in C++, and will differentiate case sensitivity and blank insensitivity.

CS.10.9.5.5	The student will write a program's pseudo code, and draw its flowchart.
CS.10.9.5.6	The student will use different header files accordingly.
CS.10.9.5.7	The student will identify and amend syntax errors and warnings.
CS.10.9.5.8	The student will apply good programming style guidelines when creating a program.
CS.10.9.5.9	The student will identify and differentiate the built-in data types available in C++, and will use them correctly to declare variables and constants.
CS.10.9.5.10	The student will identify and correctly use the assignment operator.
CS.10.9.5.11	The student will correctly define and/or initialize, and use appropriate identifiers for variables and constants.
CS.10.9.5.12	The student will correctly use *cout* to display an output on the screen and *cin* to input data from the keyboard.
CS.10.9.5.13	The student will correctly write arithmetic expressions applying integer division, type casting, modulus division, and operator precedence to perform calculations.
CS.10.9.5.14	The student will format output properly using *setf, unsetf, right, left, fill, width, fixed,* and *precision*.
CS.10.9.5.15	The student will perform tests using relational operators in numerical predicates accurately.
CS.10.9.5.16	The student will correctly write Boolean expressions using logical operators (NOT, AND, OR).
CS.10.9.5.17	The student will define what a short-circuit evaluation is.
CS.10.9.5.18	The student will write one-way and two-way conditional statements using *if* and *if-else*.
CS.10.9.5.19	The student will correctly use nested *if* statements.
CS.10.9.5.20	The student will adequately use an *else-if* ladder to decide among multiple courses of actions.
CS.10.9.5.21	The student will correctly apply the *toupper* and *tolower* functions to avoid double checking of upper or lower case characters.
CS.10.9.5.22	The student will control a program's flow using the *switch* statement to decide among multiple courses of actions and will recognize its limitations.
CS.10.9.5.23	The student will correctly use the *string* data type in combination with the *getline* and *ignore* functions.
CS.10.9.5.24	The student will use *for* loops to repeat sections of code a specified number of times.

CS.10.9.5.25	The student will correctly apply the increment and decrement operators in a loop.
CS.10.9.5.26	The student will perform calculations using compound operators in loops when possible.
CS.10.9.5.27	The student will use the *break* and *continue* statements to alter the outcome of a loop.
CS.10.9.5.28	The student will use *while* loops to repeat code a specified number of times (counter-controlled loops).
CS.10.9.5.29	The student will use *while* loops with a sentinel or flag to repeat code while a condition remains true (sentinel-controlled loops).
CS.10.9.5.30	The student will use *do-while* loops to repeat code at least once and/or for an unknown number of times while a condition is true.
CS.10.9.5.31	The student will correctly debug a program to prevent infinite loops.
CS.10.9.5.32	The student will correctly generate random integer numbers by using the *rand* and s*rand* functions combined with the *time* function.