Ministry of Higher Education & Scientific Research

PAITAXT Technical Institute-Private

Department of Computer & Network

First Year Class

2023-2024

- ***Course Book:***
  C++ Programming

- ***Language of instruction:***
  The course might be given in English

- ***Course Meeting Times:***
  Lectures: 1 session / week for 20 weeks, 2 hours / session
  Labs: 1 session / week for 20 weeks, 2 hours / session

- ***Instructor:***
  Asst. Prof. Dr. Tahseen G. Abdullah

Course Book of C++ Programming

1. Course name	C++ Programming
2. Lecturer in charge	Asst. Prof. Dr. Tahseen G. Abdullah
3. Department/ College	Computer and Network Department
4. Contact	009647504496290 Tahseen.abdullah@su.edu.krd
5. Time (in hours) /week	4 hours (2 theoretical +2 Practical) weekly.
6. Office hours	Saturday 8:30 – 12:30
7. Teacher's academic profile	• BSc in Physics, Salahaddin University-Erbil 1992 • MSc in Computational Physics, Salahaddin University-Erbil 1994 • PhD in Computational Physics, Salahaddin University-Erbil 2008
8. Keywords	C++ Programming

9. Course Overview(مقدمة) :

C++ is a general purpose programming language that supports various computer programming models such as object-oriented programming and generic programming. It was created by Bjarne Stroustrup and, “Its main purpose was to make writing good programs easier and more pleasant for the individual programmer.” By learning C++, you can create applications that will run on a wide variety of hardware platforms such as personal computers running Windows, Linux, UNIX, and Mac OS X, as well as small form factor hardware such as IoT devices like the Raspberry PI and Arduino–based boards. The history of C++ begins with C. C++ is built upon the foundation of C. Thus, C++ is a superset of C. C++ expanded and enhanced the C language to support object-oriented programming. C++ also added several other improvements to the C language, including an extended set of library routines. In this class, we will learn the basics about C++ programming language such as variables, data types, arrays, pointers, functions and classes etc.

10. Course Objective (الاهداف):

Teach students how to program using the C++ Programming Language and prepare students with the necessary programming background to proceed with C++ object-oriented programming. This is a first course in computer programming using C++. It provides a solid, non-object oriented or procedural approach to C++ programming.

Topics covered include algorithm development, basic definitions, basic elements of C++, input/output data, data types, control structures, functions, arrays, strings, data structures, bits, pointers, dynamic memory allocation, library functions and the preprocessor.

This is a fast-paced introductory course to the C++ programming language. It is intended for those with little programming background, though prior programming experience will make it easier, and those with previous experience will still learn C++-specific constructs and concepts.

11. Student's Obligation (واجبات الطالب والتزماته):

Assignments play an important role in keeping track of comprehending all the skills and problem-solving methods for topics. There will be weekly assignment sets that will be collected and graded. If you have difficulties with the questions, please come see me during my office hours or make an individual appointment. I prefer that you attempt the assignments on your own before seeking help. You are allowed to work with others on the assignments. However, the work must be your own. Do not simply copy what someone else has done. Also, if you are working in a group does not arrive at a common answer and copy it point-by-point for each group member! These assignments will be your primary means of learning the material, so please take them seriously!. Also, attendance is one of the mandatory tasks for students, since the key idea behind each topic the subject would be given during the lectures and labs. Finally, Exams are the true criterion for measuring the depth of student understands to the given material.

12. Forms of Teaching (طرق التدريس):

Different forms of teaching will be used to reach the objectives of the course: power point presentation for the head titles and definitions and summary of conclusions, classification of materials and any other illustrations, besides worksheet will be designed to let the chance for practicing on several aspects of the course in the classroom and laboratory. There will be classroom discussions and the lecture will give enough background to translate, solve, analyze, and evaluate problems sets, and different issues discussed throughout the course. To get the best of the course, it is suggested that you attend classes as much as possible, read the required lectures, teacher's notes regularly as all of them are foundations for the course. Lecture's notes are for supporting and not for submitting the reading material including the handouts. Try as much as possible to participate in classroom discussions, preparing the alignments given in the course.

13. Course Grade (مخطط التقييم):

Four unit exams (theoretical and practical) will be given during the course of the year. Though each unit exam only covers material from the previous unit exam, there is some building of concepts that will show up on later exams. Problems on the exam will be similar to problems that exist in the textbook and on homework. As may be appropriate, some or all exams may be in a take home format. A cumulative final will also be given during finals week. So that the final grade will be based upon the following criteria:

The 100 marks will be divided into:

Mid-term 1 Exam	20 %
Mid-term 2 Exam	20%
Participation and Attendance	5%
Quiz	5%
Final Exam	50 %
Total	100%

14. Student Learning Outcome (النتائج المرجوة):

By the end of this course, students should be able to:

- Understand and use the basic elements of programming and C++
- Understand and use the basic programming constructs of C++
- Manipulate various C++ data types, such as arrays, strings, and pointers
- Isolate and fix common errors in C++ programs
- The student will write a program using the C++ arithmetic operators, input/output methods, appropriate manipulators for formatting, appropriate selection statements, appropriate looping statements, and using functions with parameters passed by.

15. Course Reading List and References (المصادر):

You are responsible for all material presented in lectures. There will also generally be some extra notes in the problem sets building on the material that you should read before attempting the problem set. We strongly recommend that you attend labs, as you will almost certainly need help on the problem sets (C++ can be tricky!), but you are not required to stay for the entire lab.

Text Books:

- C++ Programming: From Problem Analysis to Program Design, D. S. Malik , Thomson, 2010, fifth edition.
- C++ A beginner's Guide, Herbert Schildt, second edition.

16. Topics Covered

First Semester		
Topics	**Chapters**	**Week number**
An Overview of Computers and Programming Languages	Chapter 1	1,2,3
Basic Elements of C++	Chapter 2	4,5,6
Data Types	Chapter 2	7,8,9
Input / Output	Chapter 3	10,11,12,13
#Review	Chapter 3	14,15
Second Semester		
Control Structures I (Selection)	Chapter 4	1,2,3
Control Structures II (Repetition)	Chapter 5	4,5,6
User-Defined Functions	Chapter 6	7,8,9
Namespaces, the class string, and User-Defined Simple Data Types.	Chapter 7	10,11
Arrays	Chapter 8	12,13
#Review	Chapter 3	14,15

19. Examinations:

Ministry of Higher Education — First year

& Scientific Research — Subject: C++

Paitaxt Technical Institute - Private — Final Examination — Time: 2 Hours

Computer and Network Department — First Trial / 2020 –2021 — Date: 2021

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Q.1: Choose and circle the correct answer of the following: *[10 Marks]*

1) What loops will always execute at least once?

(a) for	*(b) while*	*(c) do-while*	*(d) all of them*

2) Which of the following is not a standard data type?

(a) date	*(b) char*	*(c) float*	*(d) int*

3) What is the type of the constant "12"?

(a) int	*(b) char*	*(c) float*	*(d) string*

4) Which the following is not a logical operator in C++ language?

(a) &&	*(b)* &	*(c)* !	*(d)* ||

5) Which of the following is an invalid identifier?

(a) marks1	*(b)* 1marks	*(c)* my_oop_marks	*(d)* marks1oop

6) Which of the following shows the correct syntax for if statement?

(a) if *expression*	*(b)* if (*expression*)	*(c)* if {*expression*}	*(d)* if [*expression*]

7) Which of the following is not a loop structure?

(a) for	*(b) while*	*(c) do-while*	*(d) if-else*

8) How would you declare an integer called sum and initialize it to 10?

(a) int sum 10	*(b)* int sum 10;	*(c)* int sum=10	*(d)* int sum=10;

9) What is the correct way to input in an integer called check?

(a) cin>>"check";	*(b)* cin>>check;	*(c)* cin<<check;	*(d)* cin<<"check";

10) What is printed in: cout << 18 + 10 / 4 << endl; ?

(a) 7	*(b)* 20	*(c)* 20.5	*(d)* 18 + 10 / 4

Q.2: Complete the following: *[5 Marks]*

1) The escape sequence ---------- denotes tab character in C++ program.
2) ---------- is the only function all C++ programs must contain.
3) ---------- translates a program written in a high-level language to machine language.
4) A single line comment in C++ language source code can begin with----------.
5) To use `cin` and `cout`, the preprocessor directive---------- must be used.

Q.3: Answer with ***True*** or ***False***. Correct the false statement: *[5 Marks]*

1) In C++ identifier cannot be a keyword.
2) In C++ the double data types hold decimals.
3) The break command is used to exit a loop.
4) In C++: `cin>>n+4;` can be used for input.
5) In C++ the loop for (; ;) executes only one time.

Q.4: Change the following C++ code from using a while loop to for loop. What is the output result of the code? *[5 Marks]*

Answer of Q.4:

```
#include <iostream>
using namespace std;
int main()
{
int x=1;
while(x<10)
{
  cout<<x<<"\t";
  ++x;
}
return 0;
}
```

With Best Wishes *Asst. Prof. Dr. Tahseen G. Abdullah*

Answer of Q.1:

Q.1: Choose and circle the correct answer of the following:
[10 Marks]

1) What loops will always execute at least once?

(a) for	*(b) while*	*(c) do-while*	*(d) all of them*

2) Which of the following is not a standard data type?

(a) date	*(b) char*	*(c) float*	*(d) int*

3) What is the type of the constant "12"?

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10) What is printed in: `cout << 18 + 10 / 4 << endl;` ?

(a) 7	*(b)* 20	*(c)* 20.5	*(d)* 18 + 10 / 4

Answer of Q.2:

Q.2: Complete the following: *[5 Marks]*

1) The escape sequence ----- '\t' ---- denotes tab character in C++ program.
2) ------ `main()` ------ is the only function all C++ programs must contain.
3) ---Compiler-- translates a program written in a high-level language to machine language.
4) A single line comment in C++ language source code can begin with------ // ---------.
5) To use `cin` and `cout`, the preprocessor directive--`#include<iostream>`-- must be used.

Answer of Q.3:

Q.3: Answer with ***True*** or ***False***. Correct the false statement: *[5 Marks]*

1) In C++ identifier cannot be a keyword. ***True***
2) In C++ the double data types hold decimals. ***True***
3) The break command is used to exit a loop. ***True***
4) In C++: `cin>>n+4;` can be used for input. ***False (*** `cin>>n` ***)***
5) In C++ the loop for (; ;) executes only one time. ***False (*** `infinitely` ***)***

Answer of Q.4:

```
#include <iostream>
using namespace std;
int main()
{
int x=1;
while(x<10)
{
  cout<<x<<"\t";
  ++x;
}
return 0;
}
```

Output Results:

1 2 3 4 5 6 7 8 9

```
for (x=1;x<10;x++)
{
  cout<<x<<"\t";

   }
```