Course Description

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This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he/she has made the most of the available learning opportunities. They must be match to the description of the programe.

1. Educational Institution	Shatt Al-Arab University College
2. Scientific Department / Center	Computer Technology Engineering
3. Course name/code	Programming 2
4. Available forms of attendance	Weekly
5. Semester/Year	Two semesters / second year of intent

6. Number of study hours (total)	120 hours	Number of hours per week		
		theoretical	practical	Total
		2	2	4

7. Date of preparation of this description	2 – 10 - 2022

8. **Course Objectives:** Introducing to the student the object-oriented programming and the use of the advanced C++ language as an example of object-oriented programming in resolve matters related to competence through:
   - Introduce the student to variables, types of data, inputs and outputs
   - Recognizes and understands decision-making and logical, mathematical and conditional conditions
   - Recognizes and understands how to create conditions and loops and how to continue and stop
   - Recognize and understand the functions and all the identifications and definitions related to them etc.
   - Recognizes and understands matrices with one dimension and two dimensions

9. Course Outcomes and Teaching Methods, Learning and Evaluation

A- The cognitive objectives: If the student successfully completes this course, he will be able to:

A1. Defines the basic concepts of object-oriented programming.
A2. Distinguish between traditional methods of programming and the method of object-oriented programming.
A3. Describes programming problems using the Unified Modeling Language (UML).
A4. Uses C++ language instructions according to the concepts of object-oriented programming.

B . Course Skill Objectives: If the student successfully completes this course, he or she will be able to:

B1- Identifies the programming problem and solves it.
B2- Applies the concepts of analysis and programmatic design.
B3 - Builds integrated programs according to the concepts of object-oriented programming.
B4. Analyses the results of the implementation of programming systems for the purpose of evaluating their performance.

Teaching and learning methods

1. Theoretical presentation of the vocabulary of the decision.
2. Classroom group discussions of practical examples of software issues.
3. Writing programs and applying them practically in the laboratory.

Evaluation Methods

1. Written tests (quarterly and sudden).
2. Direct oral questions through discussions during the lecture.
3. Practical tests (quarterly and sudden) in the laboratory.

C. Sentimental and Valuable Objectives: If the student successfully completes this course, he will be able to:

A1. Recognizes the demands of the engineering profession and ethical responsibility as well as the need for lifelong learning to develop subjective abilities scientifically and practically.
A2 – Linking life problems with programming solutions appropriate to each problem.

Teaching and learning methods

The student is assigned to address a practical programming problem in his field of specialization and during the period of his study to analyze the problem and then develop the appropriate design to solve the problem, and finally apply the solution and implement it programmatically according to the economic and practical realistic standards.

Evaluation Methods

The results are presented in a classroom to be discussed and the rest of the learners participate in the discussion.

d. General and qualifying skills transferred (other skills related to employability and personal development).

D1. Build ideas and communicate them effectively orally and in writing.
D2. Time management and work within deadlines.
D3. Participate constructively in groups.
D4. Search for information and use of information technology.

Teaching and learning methods

A practical programming problem in the field of specialization is addressed and groups of students (the number of students in each group ranges from 3 to 4 students) for the purpose of finding a solution to that problem, where each group writes and presents a report of the results of its work within a specified period of time.

Evaluation Methods

The results are presented in a row to be discussed and the rest of the totals participate in the discussion.

10. Course Structure

Al , Week	Hours	Required Learning Outcomes	Name of the unit and/or subject	Method of education	Evaluation Method
1 - 2	4 theoretical + 4practical	The learner should be able to recall the basic concepts and tools of structural programming using the C++ language	C++ Review (Program structure, namespace, identifiers, variables, constants, enum, operators, typecastings, control structures and functions).	Theoretical presentation With the help of With Charts Illustrative + practical lectures	Achievement test + Discussion and question
3	2 theoretical + 2 practical	The student should be able to understand the basic concepts of object-oriented programming	Introduction to Object-Oriented Programming in C++.	Theoretical presentation With the help of With Charts Illustrative + practical lectures	Achievement test + Discussion and question
4 - 8	10 theoretical + 10 practical	The student should be able to analyze, design and implement software solutions to applied problems according to the concepts of object-oriented programming	Objects and Classes (Basics of objects an classes in C++, private and public members, static data and function members, constructors and their types, destructors and operator overloading).	Theoretical presentation With the help of With Charts Illustrative + Practical Lectures + Panel Discussions	Achievement test + Discussion and question + and answer my class
9 - 14	12 Theoretical + 12Practical	The student should be able to apply the concepts of heredity in the programs he builds to achieve the greatest possible reduction in the code	Inheritance (Concepts of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class).	Theoretical presentation With the help of With Charts Illustrative + Practical Lectures + Panel Discussions	Achievement test + Discussion and question + and answer my class
15 - 19	10 theoretical + 10 practical	The learner should be able to understand, design and apply programmatic problems that include the concept of polymorphism	Polymorphism (Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism).	Theoretical presentation With the help of With Charts Illustrative + Practical Lectures + Panel Discussions	Achievement test + Discussion and question + and answer my class

			I/O and File management (Concepts of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, File management functions, File modes, Binary and random files).	Theoretical presentation With the help of With Charts Illustrative + Practical Lectures + Panel Discussions	Achievement test + Discussion and question + and answer my class
20 - 24	10 theoretical + 10 practical	The student should be able to deal with files in their various forms to store and retrieve data			
25 - 30	12 Theoretical + 12Practical	The student should be able to develop general programs that do not depend on a specific type of data as well as deal with algorithms and general data structures commonly used, and be able to design programs that have the ability to deal with error situations that occur during the implementation of the program	Templates, Exceptions and STL (What is template? function templates and class templates, Introduction to exception, try-catch-throw, multiple catch, catch all, rethrowing user defined exceptions, Overview and use of Standard Template Library).	Theoretical presentation With the help of With Charts Illustrative + Practical Lectures + Panel Discussions	Achievement test + Discussion and question + and answer my class

12. Infrastructure	
1 Required textbooks	**"Object-Oriented Programming in C++"**, 4th Edition, Robert Lafore, Sams Publishing, 2002.
2 Key references (sources)	
a. Recommended books and references (scientific journals, reports,....)	**"CPA: Programming Essentials in C++"**, C++ INSTITUTE, 2016.
b. Electronic references, websites	**"C++ Tutorial"**, tutorialspoint. https://www.tutorialspoint.com/cplusplus/index.htm

13-Course improvement Plan
Increasing the number of hours of the theoretical lecture to three hours instead of the

current two hours, where the extra hour is devoted to discussing additional methods and programming examples while expanding the establishment of panel discussions leading to a better understanding of the vocabulary of the course.