COMSATS University Islamabad
Department of Computer Science
Course Syllabus

Course Information

Course Code: **CSC103** | Course Title: **Programming Fundamentals**
Credit Hours: **4(3,1)** | Lecture Hours/Week: **3**
Lab Hours/Week: **3** | Pre-Requisites: **None**

Catalogue Description:

This course emphasis the basic concepts used in programming. The topics include: Computer Programming; Basic Syntax & Semantics of a Higher-Level Language; Conditional & Iterative Control Structures; Functions & Parameter Passing; Recursion; Arrays; String Processing; Exception Handling; Refactoring; Debugging; Modern Programming Environments; Testing Fundamentals; and File I/O.

Text and Reference Books

Textbook:

1. Java How to Program, Deitel, P. & Deitel, H., Prentice Hall, 2019.

Reference Books:

1. Java: The Complete Reference, Herbert Schildt, Prentice Hall, 2018.
2. Introduction to Java Programming and Data Structures, Comprehensive Version, Y.D.Liang, Pearson, 2017.
3. Java: Programming Basics for Absolute Beginners, Nathan Clark, CreateSpace Independent Publishing Platform, 2017.

Week wise Plan:

Lecture #	CDF Unit #	Topics Covered	Reading Material
1.	1	Computer Programming: Fundamental Concepts, Programming Paradigms: Structured, Object-Oriented and Functional Programming.	Deitel: Ch1
2.	1	Introduction to Higher-Level Language, Creating and Saving Source File, Compile-link-run cycle, and Types of Errors (Syntax, Logic, Run-Time).	Deitel: Ch1
3.	2	Basic Syntax & Semantics of a Higher-Level Language (Comments, Special Symbols, Reserved Words, Identifiers); Documentation, and Program Style.	Liang: Ch2
4.	2	Variables: Allocating Memory with Named Constants & Variables, Putting Data into Variables, Declaring & Initializing Variables; Simple I/O: Input (Read) Statement, and Reading a Single Character.	Liang: Ch2
5.	2	Primitive Data Types, Expressions & Assignments, Arithmetic Operators, Order of Precedence, and Type Conversion.	Liang: Ch2
6.	2	Increment & Decrement Operators; and Simple I/O: Output & Formatted Output.	Liang: Ch2
7.	3	Control Structures; Relational Operators, Relational Operators & *boolean* Data Type, Logical Operators & Logical Expressions, and Order of Precedence.	Deitel: Ch7
8.	3	Selection: (if and if-else), Compound Statements, and Multiple	Deitel: Ch7

		Selections.	
9.	3	Selection: Short-Circuit Evaluation, Conditional Operator, and Switch Structure.	Deitel: Ch7
10.	3	Iterative Control Structure: While Loop (Designing While Loop), Counter-Controlled While Loops, Sentinel-Controlled While Loops, and Flag-Controlled While Loops.	Deitel: Ch8
11.	3	For Looping Structure, do…While Looping Structure, *break* and *continue* Statements.	Deitel: Ch8
12.	5	Reference Type: Primitive Type VS. Reference Type, Reference Variables; and Strings: Reading String as Input.	Deitel: Ch3
13.	5	String: Simple String Methods, Comparing String, Substring Methods, and Conversion between String & Numbers.	Deitel: Ch16
14.	4	Methods: Static VS. Non-Static Methods, main() Method, Predefined Methods (e.g. Math, Character).	Deitel: Ch6
15.	4	Methods: User Defined Methods, Defining a Method, Calling a Method, Void Method, and Method Returning Values.	Deitel: Ch6
16.	4	Methods: Passing Argument by Value, and Method-Call Stack & Activation Records, Overloading a Method, and Scope of Variables.	Deitel: Ch6
17.	**Mid Term Exam**		
18.			
19.	4	Recursion: Introduction, Concepts, Examples, Recursion VS. Iteration, Method Call Stack, and Recursive Backtracking.	Deitel: Ch18
20.	5	Arrays: Declare and Initialize an Array, Accessing Array Elements, Specifying Array Size during Program Execution, Array Length, Processing One-Dimensional Arrays, and Array Index Out of Bounds Exception.	Deitel: Ch7
21.	5	Declaring Arrays as Formal Parameters to Methods, Arrays as Parameters to Methods, Methods Returning Arrays, Variable-Length Argument Lists, and Command-Line Arguments.	Deitel: Ch7
22.	5	Two Dimensional Arrays: Accessing Array Elements, Initialization, and Processing Two Dimensional Arrays.	Deitel: Ch7
23.	5	Passing Two-Dimensional as Parameter to a Method, and Multidimensional Arrays.	Deitel: Ch7
24.	6	Exception Handling: Concepts, *try-throw-catch* Block, Exception Hierarchy, Exception Types, and Checked & Unchecked Exceptions.	Deitel: Ch11
25.	6	Exception Handling: Exception Handling Model, The finally Clause, Re-throwing Exceptions, and Chained Exceptions.	Deitel: Ch11
26.	6	Modern Programming Environments, Code Refactoring, and Debugging.	Ref. Material
27.	6	Programming using Library Components and their APIs.	Ref. Material
28.	6	File I/O: Files & Streams, and The Class File.	Liang:Ch12
29.	6	File I/O: Writing Data Using *PrintWriter*, Try-with-resources, and Reading Data Using *Scanner*.	Liang:Ch12
30.	7	Testing Fundamentals: Developing Test Harnesses.	Ref. Material
31.	7	Testing Fundamentals: Unit Testing.	Ref. Material

32.	7	Testing Fundamentals: Unit Testing.	Ref. Material
Final Term Exam			

Students Outcomes (SOs)

S.#	Description
1	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
2	Identify, formulate, research literature, and solve *complex* computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines
3	Design and evaluate solutions for *complex* computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
4	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to *complex* computing activities, with an understanding of the limitations
5	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.

Course Learning Outcomes (CLO)

Sr.#	Unit #	Course Learning Outcomes	Blooms Taxonomy Learning Level	SO
CLO's for Theory				
CLO-1	1-2	Explain the fundamental concepts of programming.	*Understanding*	1
CLO-2	3-5	Employ basic programming constructs using a programming language.	*Applying*	2,4
CLO-3	6	Handle programs utilizing refactoring, exceptions, and file I/O.	*Applying*	2,4
CLO-4	7	Prepare test harnesses for testing a program.	*Applying*	2,4
CLO's for Lab				
CLO -5	3-6	Implement a program using basic programming constructs.	*Applying*	2,4
CLO -6	1-7	Build a medium size application in a team environment.	*Creating*	2-5

CLO Assessment Mechanism

Assessment Tools	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5	CLO-6
Quizzes	Quiz 1	Quiz 2	Quiz 3	Quiz 4	-	-
Assignments	Assignment 1	Assignment 2&3	Assignment 4	Assignment 4	Lab Assignments	-
Mid Term Exam	Mid Term Exam	Mid Term Exam	Mid Term Exam	-	-	-
Final Term Exam	Final Term Exam					

Project	-	-	-	-	-	Lab Project

Policy & Procedures

- **Attendance Policy:** Every student must attend 80% of the lectures as well as laboratory in this course. The students falling short of required percentage of attendance of lectures/laboratory work, is not allowed to appear in the terminal examination.
- **Course Assessment:**

	Quizzes	Assignments	Mid Term Exam	Terminal Exam	Total
Theory (T)	15	10	25	50	100
Lab (L)	-	25	25	50	100
Final Marks (T+L)	**(T/100) *75 + (L/100) *25**				

- **Grading Policy:** The minimum passing marks for each course is 50% (In case of LAB; in addition to theory, student is also required to obtain 50% marks in the lab to pass the course). The correspondence between letter grades, credit points, and percentage marks at CUI is as follows:

Grade	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**F**
Marks	>= 85	80 - 84	75 - 79	71 - 74	68 - 70	64 - 67	61 - 63	58 - 60	54 - 57	50-53	< 50
Cr. Point	3.67-4.00	3.34-3.66	3.01-3.33	2.67-3.00	2.34-2.66	2.01-2.33	1.67-2.00	1.31-1.66	1.01-1.30	0.10-1.00	0.00

- **Missing Exam:** No makeup exam will be given for final exam under any circumstance. When a student misses the mid-term exam for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the Department policy. Further, the student must provide an official excuse within one week of the missed exam.
- **Academic Integrity:** All CUI policies regarding ethics apply to this course. The students are advised to discuss their grievances/problems with their counsellors or course instructor in a respectful manner.
- **Plagiarism Policy:** Plagiarism, copying and any other dishonest behaviour is prohibited by the rules and regulations of CUI. Violators will face serious consequences.