University of Asia Pacific (UAP)

Department of Computer Science and Engineering (CSE)

BSc in CSE Program

Course Outline - Structured Programming

Part A – Introduction

1. Course No. / Course Code: CSE 103

2. Course Title: Structured Programming

3. Course Type: Core Course

4. Level/Term and Section: 2nd Semester (1st Year/ 2nd Semester)

5. Academic Session: Spring 25

6. Course Instructor: Nuzhat Tabassum Progga, Nakiba Nuren Rahman

7. Prerequisite (If any): CSE 101

8. Credit Value: 3.0

9. Contact Hours: 3.0

10. Total Marks: 100

Rationale:
The purpose of structured programming is to learn how to execute codes in a linear control flow. The execution sequence follows the sequence in which the code is written. The dynamic structure of the program resembles the static structure of the program.

Course Synopsis:
This course is a basic course to programming languages using C.
The objectives of the course are to attain a basic knowledge of programming, an understanding of algorithmic issues and an ability to analyze solutions to real-life interesting mathematical problems. The topics to be covered include introduction and history of C; data types, constants and variables; operators and expressions; type conversion; decision making, branching and looping; arrays and strings; library functions and user defined functions; structures;pointers; and file management.

11. Course Objectives:
The objectives of this course are to:

1. Provide good programming principles to the **design** and **implementation** of C/C++ programs.
2. Show the use of industrial-strength software development **tools** in the programming process.
3. **Demonstrate** algorithmic issues and analyze solutions to real-life interesting problems.
4. **Apply** knowledge of data structures.

12. Course Learning Outcomes: at the end of the Course, the Student will be able to –

CLO 1	**Understand** the basic concepts of structured programming approaches and the general problems and methods related to syntax & semantics.
CLO 2	**Use** the sequence control, data control, and subprogram calls ,returns in problem solving.
CLO 3	**Apply** the concepts of Array and Strings for different problem-solving.
CLO 4	**Create (Construct)** storage management concepts using structured programming concepts of structure, union, pointer, etc.

13. Mapping / Alignment of CLOs with Program Learning Outcomes (PLO) (Optional):

CLO No.	Corresponding PLOs (Appendix-1)	Bloom's taxonomy domain/level (Appendix-2)	Delivery methods and activities	Assessment Tools
CLO1	**1**	**1/understand**	Lecture, multimedia	**Written exam**
CLO2	**2**	**1/Apply**	Lecture, multimedia	**Quiz, Written exam**
CLO3	**2**	**1/Apply**	Lecture, multimedia	**Quiz, Written exam**
CLO4	**3**	**1/Apply**	Lecture, multimedia	**Quiz, Written exam**

Part B – Content of the Course

14. Course Content:

15. Alignment of topics of the courses with CLOs:

SL. No	Topics / Content	Course Learning Outcome (CLO)
1	C Language Basics (Variables, Data Types, Operators, Input/Output)	CLO1
2	Control Structures (Conditionals, Loops, Switch Statements),functions, Recursion	CLO2
3	Arrays, String	CLO3
4	Structures,Pointers,File access, Dynamic memory allocation, Bitwise operators and macros	CLO4

16. Course Content Outline and mapping with COs:

Weeks	Topics / Content	Course Outcome	Delivery methods and activities	Reading Materials
1	Overview of computers and programming; history of C; data types, constants and variables; operators and expressions; type conversion;	CO1	Lecture, multimedia	E. Balagurusamy - Programming in ANSI C-McGraw Hill 6th edition Chapter 1,2
2	**Decision making:** branching and selection structures;if-else and switch statements, conditional operators;	CO2	Lecture, Problem Solving	Book- Teach yourself C, Herbert Shildt, Programming in Ansi C, Balagurusamy
3-4	**Repetition and Loop** Statements: for loop; while loop; do-while loop; branching and looping; loop nesting.	CO2	Lecture, Problem Solving	Book- Teach yourself C, Herbert Shildt, Lecture Slide
5-6	**Arrays**: one-dimensional, Multidimensional array.	CO3	Lecture, Problem Solving	Book-Programming in Ansi C, Balagurusamy, Lecture Slide
7	Top-down design with **functions;** parameter passing conventions, scope rules and storage classes, recursions and library functions.	CO2	Lecture	Book- Teach yourself C, Herbert Shildt, Lecture Slide
Mid Term Exam				
8	**String** manipulation with and without library functions.	CO3	Lecture, Problem Solving	Book- Teach yourself C, Herbert Shildt, Lecture Slide
9	**Structures,** array of structures, structure as function parameter	CO4	Lecture, Problem Solving	Book-Programming in Ansi C, Balagurusamy, Lecture Slide
10	**Pointers:** Concept, pointer arithmetic, multi-dimensional pointers	CO4	Lecture, Problem Solving	Book- Teach yourself C, Herbert Shildt, Lecture Slide

11	**File access.** Text vs. binary mode. Different library functions for File I/O	CO4	Lecture, multimedia Group discussion	Book- Teach yourself C, Herbert Shildt, Lecture Slide
12	**Recursion**	CO2	Lecture, multimedia	Book- Teach yourself C, Herbert Shildt, Lecture Slide
13	**Dynamic memory allocation**	CO4	Lecture, Group discussion	Book- Teach yourself C, Herbert Shildt, Lecture Slide
14	**Bitwise operators and macros** Final Overview	CO1	Lecture, multimedia	Book- Teach yourself C, Herbert Shildt, Lecture Slide
Semester Final Exam				

17. Teaching-Learning Strategies: Interactive Lectures, Google Classroom

18. Assessment Techniques of each topic of the course:

Part C – Assessment and Evaluation

19. Assessment Strategy

Class Tests: Altogether 4 class tests may be taken during the semester,3 class tests will be taken for midterm and 2 class tests will be taken for final term. 3 out of 4 class tests will be considered. CT1, best of CT2 & CT3, and CT4 will be considered.
No makeup class tests will be taken. Students are strongly recommended not to miss any class tests.

CIE- Continuous Internal Evaluation (30 Marks)

Bloom's Category Marks (out of 30)	**Tests (30)**
Understand	10
Apply	20

SMEB- Semester Mid & End Examination (70 Marks)

Bloom's Category Marks (out of 30)	**Tests**
Understand	
Apply	

Weighting COs with Assessment methods:

Assessment Type		Marks Distribution (%)	CO1	CO2	CO3	CO4
			PO1	PO2	PO2	PO3
Final Exam (50%)	Written Exam	**50**				
Mid Exam (20%)	Written Exam	**20**				
Assessment (30%)	Quiz	**30**	**10**	**10**		**10**
Total						

Minimum attendance: 70% class attendance is mandatory for a student in order to appear at the final examination.

Required References: Teach yourself C, Herbert Shildt (3rd Edition)
Programming in Ansi C, Balagurusamy

Recommended References: Turbo C/C++, Herbert Scheldt

Grading System: As per the approved grading scale of University of Asia Pacific (Appendix-3).

Special Instructions:

- Late presence: Being late by more than 30 minutes will be regarded as absent.
- Assignment submission rules: Deadlines are strictly followed. No late submission is allowed.
- Plagiarism policy: Copying code, assignment, etc will be strictly punished. Will be reported to the Chairman and action will be taken according to the university policy.

Prepared by	Checked by	Approved by
Nakiba Nuren Rahman Sadia Jahangir Safa		

Appendix-1:

Washington Accord Program Outcomes (PO) for engineering programs:

(a) Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex engineering problems.

(b) Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)

(c) Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)

(d) Conduct investigations of complex problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

(e) Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of their limitations.

(f) Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (K7)

(g) Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (K7)

(h) Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)

(i) Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

(j) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

(k) Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

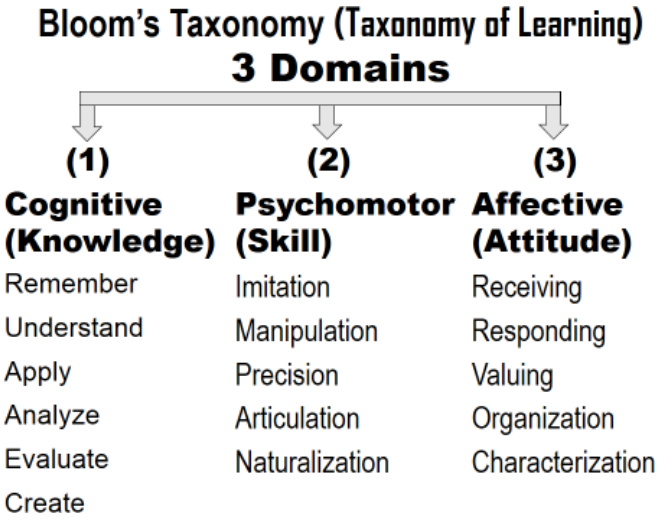
(l) Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

In addition to incorporating the above-listed POs (graduate attributes), the educational institution may include additional outcomes in its learning programs. An engineering program that aims to attain the above mentioned POs must ensure that its curriculum encompasses all the attributes of the Knowledge Profile (K1 – K8) as presented in Table 4.1 and as included in the PO statements. The ranges of Complex Problem Solving (P1 – P7) and Complex Engineering Activities (A1 – A5) are given in Tables 4.2 and 4.3, respectively.

Knowledge Profile

K1 A systematic, theory-based understanding of the natural sciences applicable to the discipline
K2 Conceptually based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline
K3 A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
K4 Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
K5 Knowledge that supports engineering design in a practice area
K6 Knowledge of engineering practice (technology) in the practice areas in the engineering discipline **K7** Comprehension of the role of engineering in society and of the identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity in economic, social, cultural, environmental and sustainability terms
K8 Engagement with selected knowledge in the research literature of the discipline

Appendix-2



Appendix-3

UAP Grading Policy:

Numeric Grade	Letter Grade	Grade Point
80% and above	A+	4.00
75% to less than 80%	A	3.75
70% to less than 75%	A-	3.50
65% to less than 70%	B+	3.25
60% to less than 65%	B	3.00
55% to less than 60%	B-	2.75
50% to less than 55%	C+	2.50
45% to less than 50%	C	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0.00