University of Asia Pacific (UAP)
Department of Computer Science and Engineering (CSE)

Course Outline: CSE 101

Program:	Computer Science and Engineering (CSE)
Course Title:	Introduction to Computer Science & Programming Methodology
Course Code:	CSE 101
Semester:	Spring-2018
Level:	1st Semester (Section A)
Credit Hour:	3.0
Name & Designation of Teacher:	Md. Imran Bin Azad, Assistant Professor
Office/Room:	**701,** 7th Floor, teacher's compound
Class Hours:	Monday & Wednesday: 9:30 AM – 10:50 AM
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Rationale:	Required course in the CSE program. This knowledge is very important to build up the knowledge of computer and programming.
Pre-requisite:	N/A

Course Synopsis:

Binary, Decimal, Octal, Hexadecimal number system and their conversion. Introduction to structured programming, **Flowchart:** what is flowchart, expressions of flowchart, importance of flow chart. **Pseudo code:** pseudo code and expression of pseudo code. **Algorithm:** Algorithm writing, relationship among algorithm, pseudo code and flow chart, code to flowchart and vice versa conversion. Introduction to C program, Skeleton of C program, **Compiler:** overview of compiler, importance and functionality, output standard library function as printf(), input standard library function as scanf(), **Data types and Variable:** different data types, variable types and their sizes, conversion among them, **scope:** global variable, local variable, static variable, auto variable . **Operators:** Types of operator in C, functionality of operators, increment – decrement operators, precedence of operators. Header files, library files, object files and their importance. **Conditional Operators:** if-else structure, switch-case structure, selection structure, statement and expression. **Control Flow:** for loop structure, while loop structure, do-while structure, sum of the series, co-ordinate geometry, design pattern using loop. **Debugging:** debug a sample program

using compiler. **Function:** argument and parameter of a function, return types, inline declaration, forward declaration of a function. **Macro:** types of macro, sample macro program, macro as preprocessor, difference between macro and function, advantages and disadvantages of macro. **Bitwise operator:** introduction to bitwise operators, their functionality and truth table of basic and, or, xor, nor algebraic functions. **Arrays:** introduction to array, declaration and definition of an array, types of array, multidimensional array, size calculation of different types of array, scanning array, programs using array, matrix multiplication using array, insertion, deletion, replacement, search from an array, advantages of array over variable.

Course Objectives (CO):	The objectives of this course are:
	1. To introduce the fundamental of computer, history, number system and others.
	2. To learn about the algorithm design and development for solving a problems.
	3. To impart adequate knowledge on the need of programming languages and problem solving techniques.
	4. To develop programming skills using the fundamentals and basics of C language.
	5. To teach the basics of preprocessors available with C compiler.
	6. To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.

Learning Outcomes (LO):	Upon completion of the course, the students will be able to:
	1. Obtain the knowledge about the fundamentals of computer organization, structure, and number system.
	2. Describe concepts of programming and key points of C programming language.
	3. Use different tools and functions of C programming language
	4. Design and develop simple program / project using the knowledge of C for solving a particular problem.
	5. Enhance their analyzing and problem-solving skills and use for writing advanced programs in C.

Teaching-learning and Assessment Strategy: Lectures, assignments, quizzes, exams

Linkage of LO with Assessment Methods & their Weights:

LO	Assessment Method	(%)
1 – 3	Quiz	10
1 – 5	Class attendance	10
3 – 5	Assignment	10
1 – 3	Midterm Exam	20
1 – 5	Final Exam	50

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

Mapping of Course LO and Generic Skills:

Learning Outcome (LO) of the Course	Generic Skills* (Appendix-1)											
	1	2	3	4	5	6	7	8	9	10	11	12
Obtain the knowledge about the fundamentals of computer organization, structure, and number system.	√											
Describe concepts of programming and key points of C programming language.	√									√		
Use different tools and functions of C programming language			√		√				√	√		
Design and develop simple program / project using the knowledge of C for solving a particular problem.		√	√		√							
Enhance their analyzing and problem solving skills and use for writing advanced programs in C		√		√	√							

Lecture Schedule

Lecture	Topic	Basic Idea
1 -2	1) Introduction of Computer and Computer Science 2) Motivation of study of Computer Science and engineering 3) What is Computer? Advantages and applications 4) Basic Structure of computer. 5) SOFTWARE, HARDWARE, System software, Application software Operating System (OS)	Introduction to Computer Science Engineering
3	1) Fundamental parts of a computer hardware 2) Introduction to CPU, CU, ALU 3) Introduction to computer memory (Internal and external). 4) INPUT/OUTPUT devices of a computer	Basic computer architecture
4	1) Different types of number system. 2) Conversions between different number system	Number System
5-6	1) What is algorithm? 2) How to write an algorithm? 3) Some examples of flow chart and algorithm.	Flow chart, Algorithm, and

		pseudo code
	4) What is flowchart? Advantages and expressions of a flowchart?	
	5) pseudo code	
	Class Test 1	Introduction to C Program
7	1) What is C?	
	2) High level and Low level languages	
	3) Smallest C program that can be compiled without error or warning?	
	4) What is the skeleton of a C program, header file, library file, preprocess, body of the program?	
	5) What is compiler, advantages of compiler?	
	6) What are the steps of compiling a simple program?	
8-9	1) What are the basic data types?	Data Types and Operators
	2) Type conversion, data loss, data loss problem solving technique?	
	3) Data size, different operators, precedence?	
	4) Declaration and definition of a variable?	
	5) Add, sub, div, multiplication, modulus operations and basic questions of them? Integer division, floating modulus.	
10	1) printf() function and its properties.	Input and Output Function
	2) scanf() function and its properties.	
11- 13	1) Basic structure of if-else, switch-case condition.	Conditional Statement
	2) Basic program using if-else, switch-case.	
	3) Nested if-else and nested switch-case.	
	4) What are the differences between statements and expressions explain with examples?	
	Class Test 2	
14	Review class	
	Mid-Term Examination	
15-17	1) Basic structure of for loop, while loop and do-while loop.	Control Flow
	2) What is the difference between for loop and do-while loop explain with example?	
	3) Practice different sum of the series.	
	4) Practice different design patterns	
18-17	1) Bitwise operations.	Bitwise Operators
	2) And, or, xor, negate operational truth table.	
20-22	1) What is array? Declaration and definition of an array.	Arrays

	2) Advantages of array over variable? 3) Lower bound, upper bound of an array. 4) Size of an array. 5) Multidimensional array, their declarations, definitions and size calculation. 6) Matrix representation of 2D or 3D array.	
Class Test 3		
23	1) What is string? 2) What are the relation between string and array? 3) String basic operations	Strings
24-25	1) Basic structure of a function. 2) What are the difference between parameter and argument of a function. 3) Inline and forward declaration of a function, example. 4) Functions return type.	Functions
26	1) What is structure? 2) What are the differences between structure and union? 3) How to calculate the size of structure and union? 4) How to declare a structure and access a structure element? 5) What are the advantages of using structure over array and variable explain with example?	Structure, Union
27	1) What is macro? 2) How to define a macro? 3) Advantages and disadvantages of a macro? 4) Differences between macro and function?	Macro
Class Test 4		
28	Review Class	
Final Examination		

Required References: #Teach yourself C.
                    - Herbert Schildt Silberschatz, Korth, Sudarshan
Recommended References: # The Complete Reference
                    - Raghu Ramakrishna, Johannes Gehrke
                 # Programming in ANSI C
                    - E Balagurusamy
                 # □□□□ □□□□ □□□□□□□□ □□□□□□□□□□
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                 # Programming with C
                    - Reema Thareja

| Grading System: | As per the approved grading scale of University of Asia Pacific (Appendix-2). |
| Student's responsibilities: | Students must come to the class prepared for the course material covered in the previous class (es). |

They must submit their assignments on time.
No late or partial assignments will be acceptable. There will be no make-up quizzes.

Appendix-1: Generic Skills

No.	Generic Skills
1.	Engineering Knowledge
2.	Problem Analysis
3.	Design/Development of Solutions
4.	Investigation
5.	Modern Tool Usage
6.	The Engineer and Society
7.	Environment and Sustainability
8.	Ethics
9.	Communication
10.	Individual and Team Work
11.	Life Long Learning
12.	Project Management and Finance

Generic Skills (Detailed):

1. **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems;

2. **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;

3. **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.

4. **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;

5. **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations;

6. **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.

7. **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;

8. **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.
9. **Communication (S)** -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;
10. **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
11. **Life Long Learning (S)** -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.
12. **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one's own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship.

Appendix-2: 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

Prepared by:

Checked by:

Approved by:
(Head of the Department)