CE/CZ1103 – Introduction to Computational Thinking and Programming (From AY2020 onwards)

Course Code	CE/CZ1103
Course Title	Introduction to Computational Thinking and Programming
Pre-requisites	NIL
No of AUs	3

Course Aims

Computational thinking (CT) is the process of analysing a problem then designing and expressing its solution in such a way that a computer can effectively carry it out. It includes a number of characteristics, such as breaking a problem into small and repetitive ordered steps, logically ordering and analyzing data and creating solutions that can be effectively implemented as programs running on computer.

The aim of this course is hence to take students with no prior experience of thinking in a computational manner to a point where you can derive simple algorithms and code the programs to solve some basic problems in your domain of studies. Student will also learn about basic program construct and simple data structures. In addition, the course will include topics to appreciate the internal operations of a processor.

Intended Learning Outcomes (ILO)

Upon the successful completion of this course, you shall be able to:

1. Describe the internal operation of a basic processor, how a program is executed by a computer and computing trends.
2. Analyse a problem then design and express its solution in such a way that a computer can effectively carry it out. (i.e. equip you with CT skills)
3. Implement problem solutions as programs using basic control structures (sequence, conditional, iterative).
4. Implement problem solutions as programs using basic data types and aggregate data types.
5. Apply the CT concepts on case studies/problem-based scenarios through hands-on practice of the CT processes.

Course Contents

	Topics
0	**Course Overview and Concepts of Computational Thinking**
1	**Overview of Programming Languages and Basic Internal Operation of Computer**
2	**Basic Program Structure: Control Constructs and Data Types**
3	**CT Concept - Abstraction**
4	**CT Concept - Decomposition**
5	**CT Concept – Pattern recognition**
6	**CT Concept – Algorithm**
7	**Basic Programming Constructs in C Language**
8	**Built-in Data Structures**

Assessment (includes both continuous and summative assessment) CE/CZ1103

a) TEL MCQs: 10%
b) Online MCQs based quizzes: 20%
c) Hands-on exercises completion and assignment: 20%
d) Assignment: 15%
e) Test: 35%

Note:
School reserves the right that content and assessment criteria may be adjusted during a given semester possibly because of circumstantial reasons. Any such changes will be discussed with the students enrolled in a given semester.

Reading and References

The course will not use any specific text book. The following books and websites will be used as reference materials.

1. The Practice of Computing using Python; William Punch and Richard Enbody, Pearson, 2017.
2. Introduction to Computation and Programming Using Python : With Application to Understanding Data; (2nd Ed) John V. Guttag, MIT Press Ltd, 2016.
3. https://edu.google.com/resources/programs/exploring-computational-thinking/
4. Programming with C; Bing Tan and Siu Cheung Hui, Pearson Education South Asia Pte Ltd, 2012, ISBN 978-981-06-9023-6.