

## ICT 1.4: INTRODUCTION TO INFORMATICS

### I. Course description:

1. Credit points: 4 ECTS

2. Time commitment:

Items	Lecture	Lab-work	Tutorial	Total
No. of hours	25	12	0	37

3. Prerequisites: No

4. Recommended background knowledge: No

5. Subject description:

Have you ever wished to write your own programs to solve your problem by a computer? To this end, you should first know how to solve the problem. Second, you need to learn the fundamental principles of computer programming. Finally, you also need to learn a way to communicate with the computer, a programming language.

In this course, you will not only learn the basic ideas behind computer programming, which aims to help students think as programmers and to provide a number of basic programming skills, but you also improve your problem-solving ability. As an introductory course, you will not learn a specific programming language but a fun and beginner-friendly programming tool called **Scratch** through which you will play around with labeled, colorful blocks of code and cartoon sprites to create your program.

Every week, students will learn how to turn your learned programming knowledge into all kinds of hands-on projects incorporating graphics, sound and animation. These assignments will increase in difficulty as the course progresses. The lab-work activities are used to correct/implement the assignments and other exercises.

The following list includes the main topics covered in the course:

- a. Introduction to fundamental programming concepts
- b. Introduction to **Scratch**
- c. Variables, data types, and basic math
- d. Input and output, and flow chart diagram
- e. Making decision by branching: **if- else** statements
- f. Repetition by looping: **for** loop and **while** loop
- g. Functions and program structure
- h. Data structure: array and string
- i. Basic algorithms: sorting and searching

6. Objectives & Outcome:

At the end of the course, students should be able to:

- Improve the problem-solving skill

- Learn common programming principles applicable to any programming languages
  - Use programming techniques as flow control, structured programming to create computer programs
  - Use **Scratch** as a programming tool to create fun, interactive and media-rich projects
  - Understand the principles of data storage, manipulation, and basic algorithms
- Get prepared for the more advanced programming courses

## 7. Assessment/ Evaluation:

Component	Attendance	Exercises	Assignments	Reports	Midterm	Final
Percentage %	10	0	20	0	30	40

## 8. Prescribed Textbook(s):

[1] Majed Marji, *Learn to Program with Scratch: A Visual Introduction to Programming with Games, Art, Science, and Math*, No Starch Press, 2014.

## II. Course content & schedule:

1. Introduction to Fundamental Programming Concepts
  - How computer programming works
  - Different Programming Methods
  - Types of Programming Languages
  - Programming Tools: Compilers, Interpreters, Editors
  - Introduction to Scratch
2. Get Started with Scratch
  - Exploring Scratch Programming Environment
  - First Programs with Scratch
  - Motion and Drawing
3. Input and Output, and Flow Chart Diagram
  - Input from Keyboard, Event-driven Input
  - Output to Monitor
  - Basic Flow Chart Diagram and Application in Algorithms
4. Variables, Data types, and Basic Math
  - Memory and Variables
  - Common Programming Data Types
  - Operators, Operands, Arithmetic Expression
5. Making decision by branching
  - Comparison & Logical Operators, Evaluating Boolean Expression
  - Flow Chart Diagram & If-Else Control Flow
6. Repetition by Looping
  - Flow Chart Diagram & Counting Loop
  - Flow Chart Diagram & Conditional Loop
  - Nested Loop, Indefinite Loop

7. Functions and Program Structure
  - Breaking large programs into Functions
  - Passing parameters to Functions
  - Nested Functions, Recursive Functions
8. Data structure: array and string
  - One-Dimensional Array
  - String Processing
9. Basic algorithms: sorting and searching
  - Linear Search
  - Bubble Sort, Selection Sort, Insertion Sort
10. Advanced Programming with Scratch
  - Create Animation, Image Effect
  - Play Sound Files
  - Sharing Your Projects over the Internet

### **III. Reference Literature:**

- [1]. Wallace Wang, Beginning Programming All-In-One Desk Reference For Dummies, For Dummies, 1st edition, 2008
- [2]. Warren Sande and Carter Sande, Hello World! Computer Programming for Kids and Other Beginners, Manning Publications, 1st edition, 2009.
- [3]. Jr. Jerry Lee Ford, Scratch Programming for Teens, Cengage Learning PTR, 1st edition, 2008.