COURSE NET1010: DIGITAL TECHNOLOGY 1

Level: Introductory

Prerequisite: None

Description: Students construct and demonstrate logic systems and their unique functions.

Parameters: Access to a five-volt power supply, a logic probe and related materials.

Outcomes: The student will:

1. **describe the binary numbering system and logic gates and construct and verify basic logic gates**
   - 1.1 research and describe the binary numbering system
   - 1.2 develop the circuits and tables for the following logic gates:
     - 1.2.1 AND
     - 1.2.2 OR
     - 1.2.3 NOT
     - 1.2.4 XOR
     - 1.2.5 NAND
     - 1.2.6 NOR
     - 1.2.7 XNOR
2. **construct a simple logic circuit and explain its functions**
   - 2.1 construct digital probes
   - 2.2 test digital probes
   - 2.3 breadboard a digital system, such as a combination lock and a keyboard
   - 2.4 use emulation software; e.g., electronics workbench
3. **identify the major integrated circuit (IC) families and describe their unique functions**
   - 3.1 distinguish between analog and digital systems
   - 3.2 identify major component sections of a logic system including:
     - 3.2.1 random-access memory (RAM)
     - 3.2.2 read-only memory (ROM)
     - 3.2.3 central processing unit (CPU)
     - 3.2.4 registers
     - 3.2.5 input/output (I/O) ports
   - 3.3 identify the application, pinouts and use of various IC chips from manufacturing codes
   - 3.4 identify characteristics of various IC chips from different manufacturers which do similar functions using ECG, NTE and other replacement guides
   - 3.5 identify the pinouts and function of any IC using the IC master reference texts
   - 3.6 identify the difference between various logic families
   - 3.7 identify and explain differences between various logic systems
   - 3.8 solve a digital problem and build a digital system for a solution; e.g., two or three inputs for a single output
4. **demonstrate established laboratory procedures and safe work practices**
   - 4.1 identify and follow laboratory safety procedures
   - 4.2 explain how to avoid electrostatic discharges around IC chips
   - 4.3 demonstrate an understanding of grounding, voltage and current rating of various IC families
   - 4.4 use a digital probe

5. demonstrate basic competencies

5.1 demonstrate fundamental skills to:
- 5.1.1 communicate
- 5.1.2 manage information
- 5.1.3 use numbers
- 5.1.4 think and solve problems

5.2 demonstrate personal management skills to:
- 5.2.1 demonstrate positive attitudes and behaviours
- 5.2.2 be responsible
- 5.2.3 be adaptable
- 5.2.4 learn continuously
- 5.2.5 work safely

5.3 demonstrate teamwork skills to:
- 5.3.1 work with others
- 5.3.2 participate in projects and tasks

6. make personal connections to the cluster content and processes to inform possible pathway choices

6.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences

6.2 create a connection between a personal inventory and occupational choices