**Dominican International School**



**ICT / ROBOTICS 8**

Grade Level:   8                                                    Teacher: Mr. Ed Solis
1 Year, 1 Credit                                                   Email: esolis@dishs.tp.edu.tw
SY: 2024-2025

<u>**Overview of ICT / ROBOTICS 8:**</u>

**Course Design**

Part 1: The Robotics curriculum opens the exciting world of computer science and robotics to middle school students in a fun and practical way. The lessons are constructed from hundreds of hours of actual middle school classroom experience. The learning activities are created from fun robotic projects designed to be inspiring and engaging, helping students see computing and technology as an important part of their world. The activities are designed with a focus on problem-based learning, creativity, exploration, critical thinking, and problem-solving. Learn computer programming concepts and develop Scratch coding skills. Study the basic elements of algorithms such as sequence, decision, and iteration. Learn about using pseudocode, flowcharts, and block diagrams. Develop programs with variables, loops, conditional instructions, and functions. Learn how to assemble mBot and understand basic robot system components. Use the scientific method to perform characterization studies of mBot sensor operation. Learn about robotic command and control programs by designing a state machine. Design an integrated, multi-input/output, robotic control program using the mBot RGB LEDs, Piezo Buzzer, Motors (Forward, Right Turn, Left Turn, and Backwards), Ultrasonic Sensor, Line Follower Sensor, and Light Detector Sensor. Explore the Software Development Life Cycle and learn about brainstorming, project planning, and the importance of reuse in technology development.

Part 2: Page Designing. This course introduces the basic principles of imaging and graphic design using Adobe Photoshop in preparation for their yearbook page. From simple photo editing and compositing to digital painting, and graphic design.

Teaching materials for the course come from textbooks, classroom lectures, newspapers, journals, medical newsletters, videos, and the Internet.

REFERENCE:

- **Programming Arduino: Getting Started with Sketches**, Second Edition by *Simon Monk*

- **mBot Discovery: Learn & Teach Robotics In 12 Fun Lessons**, 2018 by *David Romano*

REFERENCE/LINKS:

- https://www.amazon.com/Programming-Arduino-Getting-Started-Sketches/dp/1259641635/ref=zg_bs_3956_3?_encoding=UTF8&psc=1&refRID=5R39R5EMX0GBCS70C1J5

- https://www.amazon.com/mBot-Discovery-Learn-Robotics-Lessons/dp/0692139435/ref=sr_1_fkmr0_1?keywords=mBot+discovery+LEVEL+1&qid=1566007201&s=gateway&sr=8-1-fkmr0

ROBOTICS STANDARDS:

- https://educationalliancefinland.com/products/mbot-series-steam-robots

**Our school website**: http://www.dishs.tp.edu.tw/

## Course Content:

The students will learn the different ways of Desktop Publishing, particularly page layout and design. Also, the course contains the basic modules in C Programming which would lead to basic Robotics.

## Course Goal

- The students will learn simple C programming leading to Robotics
- The students will discover how to write basic sketches
- The students will use Arduino's modified C language, store data, and interface with the Web
- The students will get hands-on coverage of C++ library writing, and programming Arduino for the Internet of things.
- The students will understand Arduino hardware fundamentals
- The students will learn to produce positive and constructive interactions among the group members
- The students will learn to enhance further their skills in applying the different software
- The students will learn how to organize their ideas in creating the desired outcome
- The students will learn about using pseudocode, flowcharts, and block diagrams.
- The students will develop programs with variables, loops, conditional instructions, and functions.
- The students will learn how to assemble mBot and understand basic robot system components.

- The students will use the scientific method to perform characterization studies of mBot sensor operation.
- The students will learn about robotic command and control programs by designing a state machine.
- The students will design an integrated, multi-input/output, robotic control program using the mBot RGB LEDs, Piezo Buzzer, Motors (Forward, Right Turn, Left Turn, Backwards), Ultrasonic Sensor, Line Follower Sensor, Light Detector Sensor.
- The students will explore the Software Development Life Cycle and learn about brainstorming, project planning, and the importance of reuse in technology development.

## Grading Criteria:

The quarterly grade will be awarded for all student work based on the following criteria:

- ✓ **Class participation and Seatwork** - 3/10 of quarterly grade
- ✓ **Major Projects, Quizzes, and Tests**- 3/10 of quarterly grade
- ✓ **Quarterly Exams**- 3/10 of quarterly grade
- ✓ **Deportment** - 1/10 of quarterly grade

## Student Materials Required:

- The students will need to bring a flash drive (USB drive) to save their works

## Laboratory Expectations:

1. Be on time to class; be seated **before** the bell rings.
2. Wear your uniform neatly.
3. Use English at all times.
4. Come prepared with books, assignments, and supplies and without gum, food, or drink (a sealable water bottle is okay).
5. Be respectful of others (especially when speaking), and of school property.
6. Do your best and participate.
7. Ask permission before leaving the class; take a hall pass.
8. Wait for the bell to ring before you leave class.

## Seatwork rules

1. The students may NOT copy from classmates
2. The students are allowed to help each other verbally.
3. The students are NOT allowed to do the work, partially or entirely, for other students. Specifically, they are not allowed to touch the keyboard and mouse of other students' computers.

## **Discipline:**

1. Verbal warning, second reminder (if needed)
2. Write-Up and then refer to the Discipline Office.
3. Parent-Teacher conference.

# FIRST QUARTER WEEKLY SCHEDULE

| Week | Topic |
|:----:|-------|
| **1** | Introduction to Robotics |
| **2** | Random Motion |
| **3** | Robot Design I: Carry-In Front |
| **4** | Mixed Colors and Sound |
| **5** | Robot Design II: Carry At The Back |
| **6** | Robot Design III: Challenge Design |
| **7** | Quarterly Exams |

# SECOND QUARTER WEEKLY SCHEDULE

| Week | Topic |
|------|-------|
| 1 | Control Movement Program |
| 2 | Control Movement, Sound, and Light Program |
| 3 | Cliff Detection Program |
| 4 | Avoid Barriers Program |
| 5 | Line Follow Program |
| 6 | Robot Racing |
| 7 | Robot Wrestling |
| 8 | Quarterly Exams |

# THIRD QUARTER WEEKLY SCHEDULE

| Week | Topic |
|:---:|:---|
| 1 | Changing Colors with Variables Program |
| 2 | The On-board Button and Timer Program |
| 3 | Line Counting Program |
| 4 | Matrix Connection with Text/Numbers Appearance |
| 5 | Object Avoidance with Functions and Parameters Program |
| 6 | Serial Communications Program |
| 7 | Maze Problem Solving |
| 8 | Quarterly Exams |

# FOURTH QUARTER WEEKLY SCHEDULE

| Week | Topic |
|:---:|:---|
| **1** | Introduction to Photoshop |
| **2** | Photo Editing |
| **3** | Digital Painting |
| **4** | Graphic Designing |
| **5** | Text Enhancements |
| **6** | Yearbook Page Creation |
| **7** | Yearbook Page Creation |
| **8** | Quarterly Exams |