# American International University- Bangladesh (AIUB) Faculty of Engineering

**Data Communications Lab**

**Open Ended Lab (OEL)**

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| **Course Name:** | **Data Communication** | | |
| **Course Code:** | EEE 3205 | **Section:** |  |
| **Semester:** | Spring 2023-24 | **Group No:** |  |
|  | | | |
| **Assignment Name:** | **Open Ended Lab (OEL)** | | |
| **Assessed CO2: Assessed CO5** | Convert this bit stream to digital signal using different Line Coding Method | | |
| **Assessed POI:** | **P.d.1.C5** | | |
|  |  | | |
| **Student Name:** |  | **Student ID:** |  |
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**Mark distribution (to be filled by Faculty):**

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| --- | --- | --- | --- | --- |
| Objectives | Proficient [10-8] | Good [7-4] | Needs Improvement [3-1] | Secured Marks |
| **Depth of** | Student was able to apply in- depth engineering knowledge achieved by appropriate research about digital/analog communication to design the communication model  correctly and **fulfilled all design criteria**. | Design process is not completely | Design process contains mistakes |  |
| **knowledge** | supported by in-depth | and does not display enough in- |
| **displayed** | engineering knowledge achieved | depth engineering knowledge |
| **through** | by appropriate research about | achieved by appropriate research |
| **appropriate** | digital/analog communication, | about digital/analog |
| **research** | **some but not all of the design** | communication. **Most of the** |
| **(P1)** | **criteria are fulfilled**. | **design criteria are not fulfilled**. |
| **Depth of analysis (P3)** | Student defended the diversified approach taken to solve the problem with **well- justified in-depth analysis that demonstrated abstract thinking**. | Student’s attempts to analyze the diversified approach taken to solve the problem **is not enough in-depth, some of design choices do not demonstrate**  **adequate abstract thinking** and are not properly justified. | Student **did not attempt any in- depth analysis** of the designed system and **displayed no abstract thinking**. |  |
| **Level of** |  | Student was able to identify some of the problems correctly and integrated the interdependent parts into a high-level design using a block diagram.  Some parts of the block diagram were not a good match for the given problem. | Student was able to identify only |  |
| **integration** | Student correctly identified all | one/two of the problems correctly |
| **of multiple** | problems and successfully | and could not properly integrate |
| **sections of** | integrated the interdependent | the interdependent parts into a |
| **design for** | parts into a high-level design | high-level design using a block |
| **solution of** | using a block diagram. | diagram. |
| **high-level** | Block diagram was at best | Only one/two blocks were correct |
| **problem** | match with the given problem. | and/or block diagram was |
| **(P7)** |  | incomplete. |
| **Comments:** |  |  | **Total Marks (Out of 30):** |  |

**Question:** Digital to digital conversion is the way of representing digital data by using digital signals. The conversion involves three techniques: line coding, block coding, and scrambling. Assume your ID is AB-CDEFG-H, and then convert ‘B’, ‘E’ and ‘G’ to 4-bit binary to have a bit stream of 12 bits. Convert this bit stream to digital signal using the following methods:

1. Polar NRZ-I (invert) assuming bit rate is 4 kbps.
2. Differential Manchester assuming bit rate is 2 kbps.
3. Pesudoternary assuming bit rate is 5 kbps.
4. MLT-3 assuming bit rate is 10 kbps.

**Software:**

* MATLAB

**Task:**

* + Demonstrate an experiment using MATLAB tool to the convert digital bit stream to digital signal

**Lab Report**

Your lab report and presentation should include the following sections:

# Purpose

This is a summary statement of the work to be accomplished in this experiment. An overall direction for laboratory investigation, the obtained result and summary of conclusions must be provided.

# Procedure

Explain step-by-step procedure in a numbered sequence so that other learners can comprehend the experiment and be able to reproduce the experiment by reading your procedure.

# Results

The MATLAB code used along with the necessary diagrams to represent the proper functioning of the experiment should be provided with proper labeling.

# Discussion and Conclusions

This section should be based on the information described in the report and is the closure of your report. Any advantages or limitations of the experiment should be included here. Any problems encountered while performing a particular step in the experiment can also be mentioned here.

# Reference

Proper referencing of the report is required.