**American International University- Bangladesh (AIUB)**

**Faculty of Engineering**

**Data Communications Lab**

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| **Course Name:** | **Data Communications** | | |
| **Course Code:** | CoE 3201 | **Section:** |  |
| **Semester:** | Spring 2024-25 | **Group No:** |  |
| **Assignment Name:** | **Open Ended Lab** | | |
| **Assessed CO5:** | **Accepts and recognizes the role of shift keying (ASK) and multiplexing (FDM) to communicate binary bits as analog signals through multiple channels in society, health, safety, legal and culture** | | |
| **Assessed POI:** | **P.f.1.A3** | | |
| **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 knowledge displayed through appropriate research**  **(P1)** | 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 supported by in-depth engineering knowledge achieved by appropriate research about digital/analog communication, **some but not all of the design criteria are fulfilled**. | Design process contains mistakes and does not display enough in-depth engineering knowledge achieved by appropriate research about digital/analog communication. **Most of the 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 integration of multiple sections of design for solution of high-level problem**  **(P7)** | Student correctly identified all problems and successfully integrated the interdependent parts into a high-level design using a block diagram.  Block diagram was at best match with the given problem. | 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 one/two of the problems correctly and could not properly integrate the interdependent parts into a high-level design using a block diagram.  Only one/two blocks were correct and/or block diagram was incomplete. |  |
| **Comments:** |  |  | **Total Marks (Out of 10):** |  |

# Task

* Convert multiple Digital data x1 and x2 (as binary bits) into Analog signals using ASK (Amplitude shift keying)
* Consider x1=[10101], and x2=[01010];
* During plotting digital bit stream consider unipolar NRZ signal with bit duration 1 Sec
* Consider analog signals frequency 2 Hz and 4 Hz respectively, for ASK modulation of signal x1 and x2.
* Multiplex the multiple ASK modulated analog signals using FDM (Frequency Division Multiplexing) to produce a composite signal
* De-multiplex the composite analog signal back into individual analog signals and perform the ASK demodulation to recover x1 and x2 digital signals
* Finally, plot the x1 and x2 digital signals with 1 second bit duration as unipolar NRZ signal.

Note: A sample output for the code is attached in the next page.

# OEL Report

**Submission Deadline: Annouced in the Teams**

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.

# Impact on Society, health and safety

You need to analyse the impact shift keying (ASK) and multiplexing (FDM) have on Society, Health, Safety and Culture.

# 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 should be used, citing at least two resources that you have used for this report

**Final output figures should like this:**

A diagram of a waveform

AI-generated content may be incorrect.