



American International University- Bangladesh (AIUB)

Faculty of Engineering

Data Communications

Term Assessment Lab Project

20 marks

Deadline: August 22, 2022, 9 pm.

Suppose you want to send a message which contains the **FIRST NAME** of all group members. Using MATLAB, perform the following tasks and explain each step of your design.

1. Convert the message to its ASCII Code.
2. Convert the ASCII code to the right number format for transmission.
3. Convert digital data to digital signal using at least $100 + \text{VAL1} \times 20$ sample data for each signal level.
4. Now, modulate the digital signal using BASK/BPSK/4QAM/16QAM (**dependent on group, see list on next page**) to send via a transmission channel and show the constellation diagram.
5. Introduce some noise during transmission, assuming that the **SNR** of the channel is **VAL1+30 dB** and show the constellation diagram.
6. Demodulate the received signal.
7. Convert the binary data to retrieve the message.
8. Confirm if message in step 6 matches original message.
9. Change the SNR value and find the threshold of SNR where transmitted message cannot be reconstructed at the receiver anymore. Show the received signal constellation diagram for this case.

Values and/or waveforms of input message and the outputs of all steps must be shown. Constellation diagrams only needed in steps 4, 5, 9.

Parameters:

Consider, your group number = **VAL1**.

Use *scatterplot(sig_var)* for plotting constellation diagram where *sig_var* is the variable whose diagram you want to plot.

Instructions:

1. Plagiarism is strictly prohibited.
2. Please use MATLAB software to accomplish the project.
3. Make a powerpoint presentation explaining how you solved each task. Record the presentation making sure both your face and the powerpoint slides are visible and your voice is clearly audible. Include the simulation as the last part of your presentation.
4. **First slide of the ppt must credit the group members who contributed to the project.**
5. Submit your lab project presentation before the deadline. Submission **must be in video format**. DO NOT submit .ppt files.
6. Finally submit it at the link on next page (more instructions available at the form).

Group No	Modulation
1	16QAM
2	4QAM
3	4QAM
4	BPSK
5	BPSK
6	16QAM
7	BASK
8	BASK

Marking Rubric for Project Presentation (20):

Category	Proficient [5]	Good [4]	Acceptable [3-2]	Unacceptable [1-0]	Secured Marks
Experimental procedure	<ul style="list-style-type: none"> Working procedure is clearly presented. Methods are clearly shown including all steps in sufficient detail for the experiment to be repeated. Simulation runs correctly and gives expected output. 	<ul style="list-style-type: none"> Working procedure is given for the experiment to be sufficient. Methods are correct but the steps may be lacking in detail, making the experiment hard to be repeated. Simulation runs but output is somewhat different from expected. 	<ul style="list-style-type: none"> Working procedure is missing some steps and/or contains some mistakes. Simulation runs but output is significantly different or simulation does not run due to small mistakes. 	<ul style="list-style-type: none"> Working procedure is absent or missing major steps and/or contains mistakes. Simulation is fully wrong or does not work at all due to major mistakes. 	
Diagrams/Plot Accuracy	<ul style="list-style-type: none"> Clear, accurate diagrams are included with prop Diagrams are labeled neatly and accurately with excellent detail. Experimental data meets all criteria; results are described clearly and accurately. Project questions are properly answered with detailed justification or calculations. 	<ul style="list-style-type: none"> Diagrams are included and are correctly labeled in brief, but there may be some lack of clarity. Most criteria are met, but there may be some lack of clarity and/or incorrect information. Project questions are answered correctly but may be lacking detail or contain minor logical error. 	<ul style="list-style-type: none"> Diagrams are included and are labeled, minor mistakes may be present. Experimental Data and results do not match exactly with the theoretical values and/or analysis is unclear. Project questions are answered but contain wrong information or major logical error. 	<ul style="list-style-type: none"> Needed diagrams are missing or are missing important labels. Results are missing or completely incorrect. 	
Visual Aids and Delivery Style of Presentation	<ul style="list-style-type: none"> Information is clear and concise with proper key information in points or phrases; Very visually appealing and engaging Regular eye contact; Appropriate speaking volume & body language; 	<ul style="list-style-type: none"> Too much information in complete sentences on slides along with the necessary key information in phrases; Some visual appeal Adequate volume and energy; Generally good pace and diction; Few or no distracting 	<ul style="list-style-type: none"> Too much information in complete sentences on many slides; Some proper key information; Minimal effort made to make slides appealing More volume or energy needed at times; 	<ul style="list-style-type: none"> Too much information in complete sentences on slides; No or few proper key information; Repetition of the same information on multiple slides; No visual appeal Low volume and energy; 	

	<ul style="list-style-type: none"> • Proper pace and diction; • Fluent avoidance of repetitions, hesitations, gap fillers 	gestures; <ul style="list-style-type: none"> • Few repetitions, hesitations, gap fillers 	<ul style="list-style-type: none"> • Pace too slow or fast; • Some distracting gestures or posture; • Some repetitions, hesitations, gap fillers 	<ul style="list-style-type: none"> • Pace too slow or fast; • Poor diction; • Lots of distracting gestures or posture; • Frequent repetitions, hesitations, gap fillers 	
Originality	<ul style="list-style-type: none"> • Project shows effort through unique solution and no plagiarism is detected. 	<ul style="list-style-type: none"> • Clear plagiarism is not detected and result is unique, but approach is common showing low effort. 	<ul style="list-style-type: none"> • Partial plagiarism of process is found showing minimal effort but final result unique. 	<ul style="list-style-type: none"> • Almost completely or completely plagiarized. 	
Comments:				Total Marks (Out of 20):	