

## COMM 702: Modulation II

### Project

**Weight:** 10 %

**Project group:** 4 students.

**Project submission deadline:** 29<sup>th</sup> of November (29/11/2017)

**Presentation of the project:** To be announced (each student in the group will be evaluated).

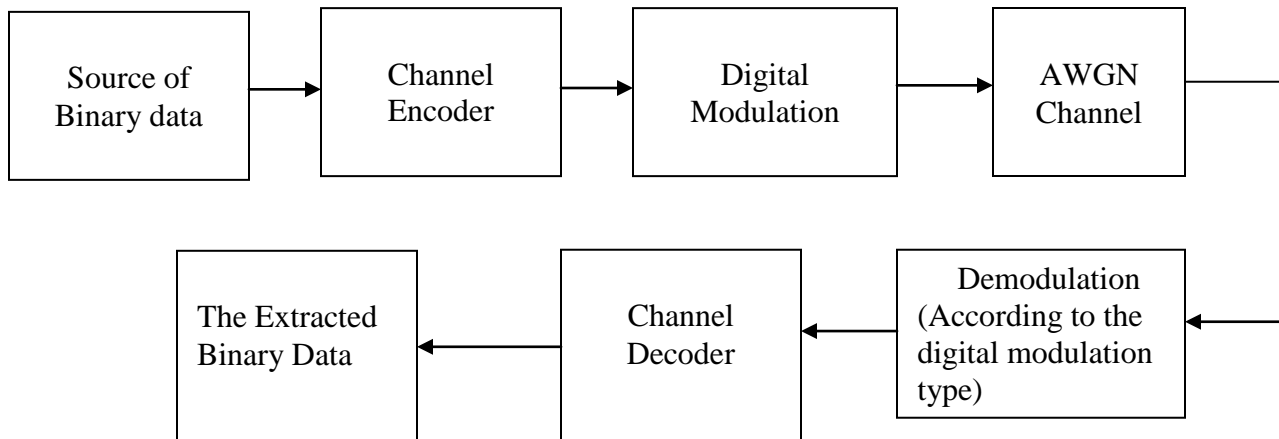
**Tool:** Use MATLAB. M-files are required (do not use Simulink).

**General instructions:**

- (1) The Project will be submitted as a hard copy. The m-file must be included in the appendix of the hard copy of the project.
- (2) The hard copy includes:
  - Block diagram of the simulated system.
  - The obtained results (FIGURES) as explained below.
  - Give comments on the obtained results.

**Project Description**

Simulate the following block diagram of a digital communication system.



- Generate binary random data (Use the uniform random generator of the MATLAB).
- Use convolutional code for channel encoder or any other channel coding.
- Use the following types of digital modulations to modulate the resulting bits:
  - Coherent BPSK
  - Coherent OOK
  - 8-PSK

- Generate a white Gaussian noise with zero mean (and of course with different variances (power) to adjust the SNR) and add this noise to the digitally modulated signal.
- Use the suitable demodulator in the receiver (according to the used digital modulation type).
- Evaluate the performance of the system:
  - Probability of error versus SNR with and without channel coding
  - Compare the performance of all the used digital modulation types.
- Plot the theoretical Probability of error versus SNR and compare plot it with the simulated one in one figure (to show the accuracy of simulation). **(Bonus 2% in Quizzes, assignments, and project).**

**Required Results:**

- Plot the Bit Error Rate versus the SNR for the three mentioned modulation types **In one Figure to Compare between them. [12 marks]**
- Comments on the results (each curve) **[3 marks]**
- Plot the theoretical Probability of error versus SNR and compare plot it with the simulated one in one figure (to show the accuracy of simulation). **(Bonus 2%)**

Prof. Ahmed El-Mahdy C3-213  
 ahmed.elmahdy@guc.edu.eg