ECE4260 Communication Systems, Winter 2021
Assignment 4

Due: 24. March, 11:59 PM

Instructions:

- Scan your solution into a *single* PDF file.
- To upload the solution, go to:
  `UM Learn` → `Assessments` → `Assignments`.
- If you submit more than one file, only the last submitted file will be retained by the system.
- You have to upload by the deadline given above. Late submissions are not possible/accepted.
- Please do not email your solution.

An audio signal which has a bandwidth of 16 kHz is to be transmitted using digital modulation, over a communication channel of 200 kHz bandwidth.

Suppose the audio signal can be sampled at the Nyquist rate. We need to choose the A/D converter resolution (in bits/sample) depending on the modulator that will be used (obviously the resolution can only be an integer.)

1. If a binary PSK modulator powered by a 10 mW battery will be used, determine the maximum allowable A/D resolution.

2. Instead, a programmable M-PSK modulator powered by a 75 mW battery will be used. It is programmable in the sense that M can be set to any integer power of 2. If the same noise margin as in the case of the binary PSK modulator in part 1 is to be maintained, determine the maximum allowable A/D resolution.