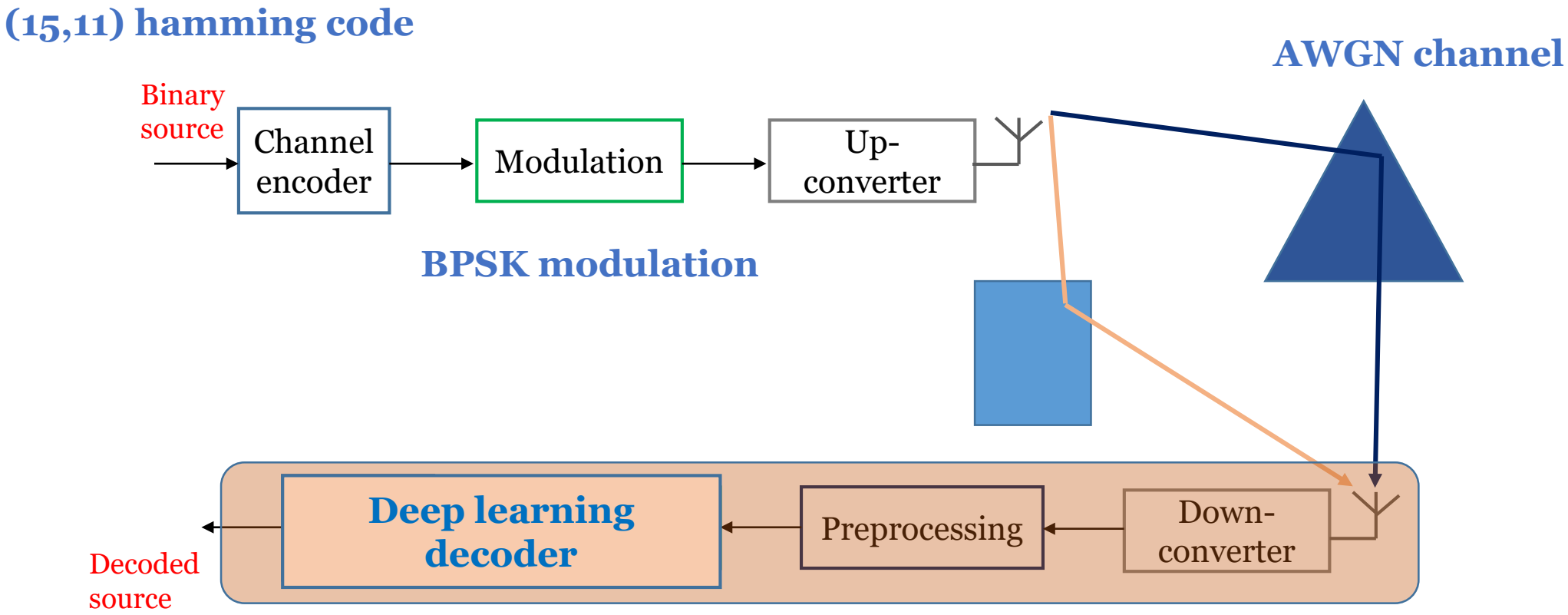
AI Lab for Wireless Communications

Week5 – Mini project

Speaker: Kuan-Yu Lin

System model



Encoding part

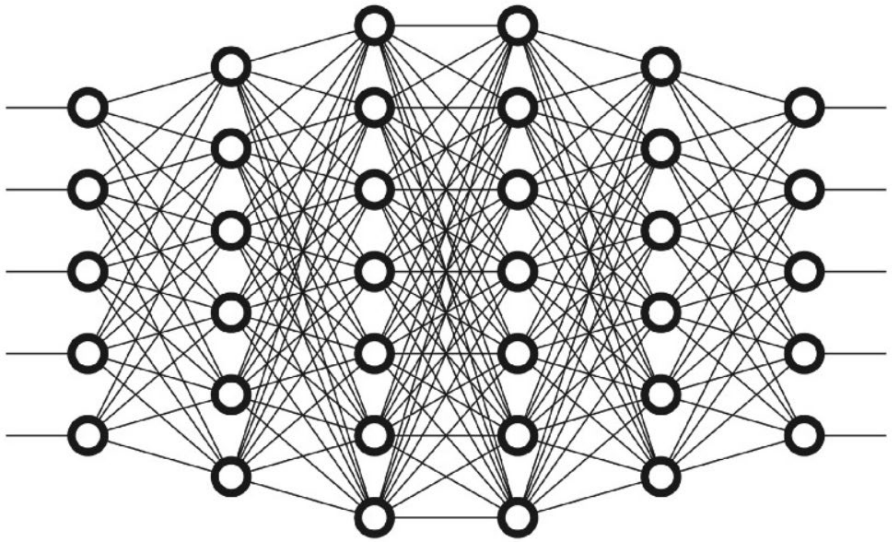
- (15,11) Hamming code
- Relationship: $\boldsymbol{c = mG}$, $\boldsymbol{rH^T = 0}$,
- Parity check matrix

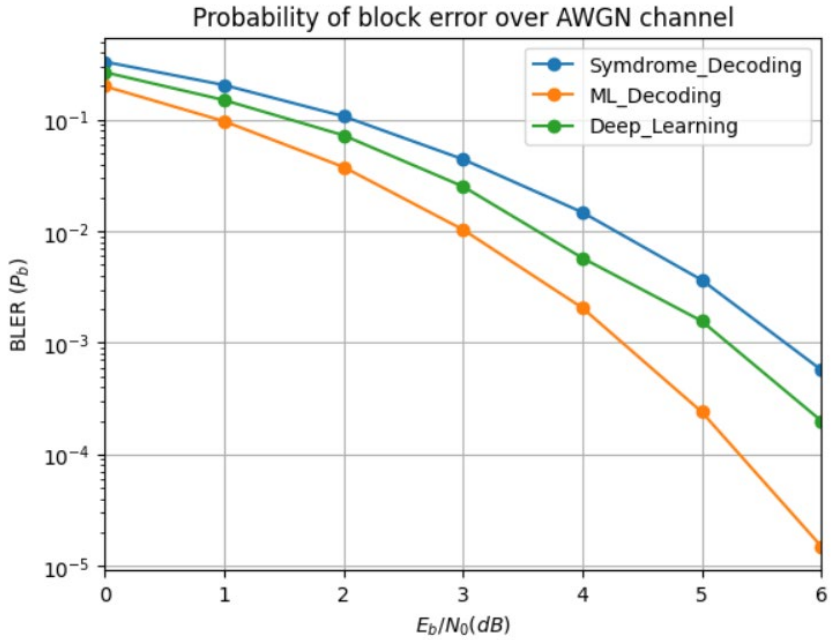
$$H = \begin{bmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 1 & 1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} = [P^T \quad I_4]$$

$$G = [I_{11} \quad P]$$

Decoding part

- Deep learning
- Design your own model





Grading

- Implement the whole communication system
- Demo
  - Part 1: 80%

  BLER of deep learning method should be better than syndrome decoding
  - Part 2: 20%

  Try to design the model better

Grade	rank of the class
100	1~5
95	6~10
90	11~15
85	15~22

Module 1 - Report Assignment

- Hand in a report including
  - ➢Description of mini project
  - ➢Description and results of all decoding method in Module 1

    Simulation results (BLER of all decoding method) is necessary!
- **Deadline 4/5 24:00**