

# 20SK – Signals and Codes

---

## Lecture 12 – Hamming codes. Binary cyclic codes (2014/01/07)

Topics discussed:

- Hamming code as a perfect code for correction of single errors. Constructing parity check and generator matrices.
- Syndrome. Error correction.
- Code-word as a polynomial, cyclic shift
- Generator polynomial, encoding binary cyclic code
- Parity check polynomial, decoding a binary cyclic code

The relevant literature is [1, chapter 3], [2, chapters 10 and 12] and [3, chapter 4].

### Resources

- [1] Morelos-Zaragoza, R. H.: *The Art of Error-Correcting Coding*. 2<sup>nd</sup> edition, John Wiley & Sons, 2006, 263pp.
- [2] Adámek, J: *Foundations of Coding: Theory and Applications of Error-Correcting Codes with an Introduction to Cryptography and Information Theory*. Wiley Interscience, 1991, 352 pp.
- [3] Moon, T. K.: *Error Correction Coding – Mathematical Methods and Algorithms*. Wiley Interscience, 2005, 756 pp.