Preparation for exam

Theory subjects (titles are based on the lecture slides)

Note: the subjects below can be adjusted (shortened, grouped differently) at the exam, so don't consider this as an absolute definitive list

Chapter I. Error Control Coding (cyclic codes)

1. Cyclic codes: definition, generator polynomial, proof of the cyclic property
2. Circuits for multiplication / division of binary polynomials (1 out of 4): schematic, operation, what do they do
3. Systematic cyclic encoder circuit (1-error-correcting): schematic, operation, explain why it outputs the desired codeword
4. Deduce the parity-check matrix H for systematic cyclic codes
5. Systematic cyclic decoder with LFSR (1-error-correcting): schematic, operation, prove why it corrects the erroneous bit
6. Thresholding cyclic decoder: explanations, schematic, operation

Chapter II. Random signals

7. Random variables: definition, realization, sample space, discrete/continous, PMF and CDF (discrete), CDF and PDF (continuous), basic properties of PDF/PMF/CDF
8. Random process: definition, discrete/continous-time, realization, distributions of order 1,2,..n,
9. Statistical and temporal averages
10. Stationarity (definition and consequences) and ergodicity
11. Autocorrelation function: definition, Wiener-Khinchin theorem (no proof), properties (with proofs)

Chapter III. Elements of Signal Detection Theory

12. Model schematic, explanation of blocks, particularization for binary case
13. Minimum risk criterion (for binary case): definition of costs, risk, proof of the decision rule, particular cases (ideal observer, maximum likelihood)

Exercises

Based on all exercises from the laboratories/seminars + examples done during lectures