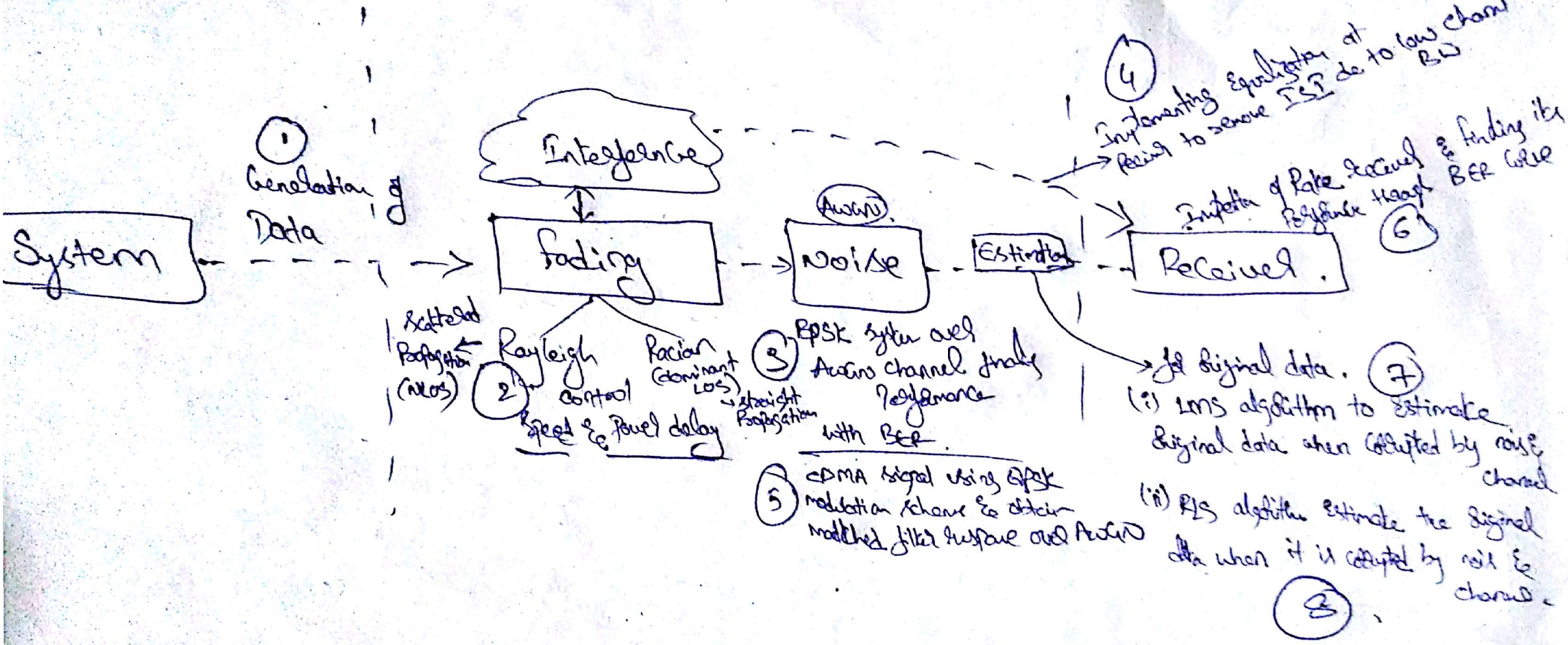
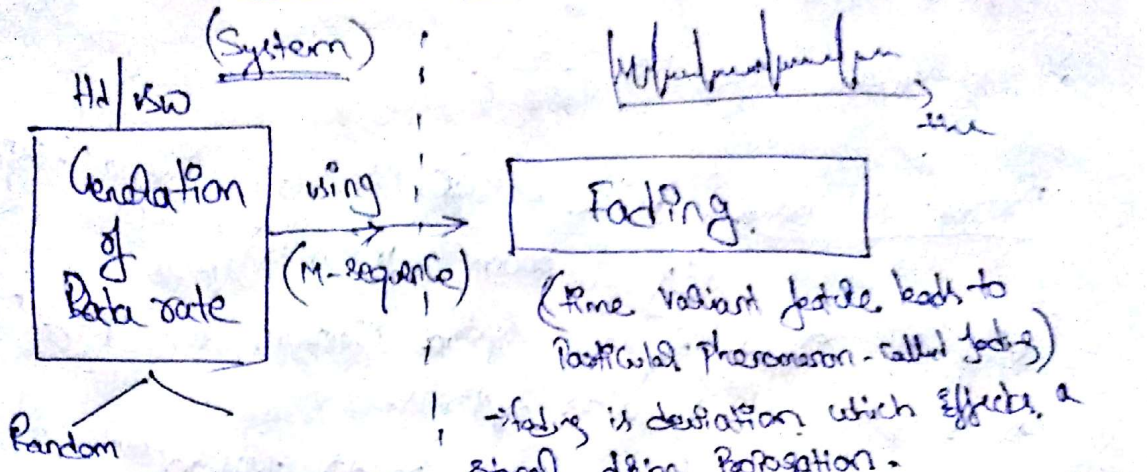
Advanced Communication LAB overview:-



Advanced Communication LAB:-

(System)



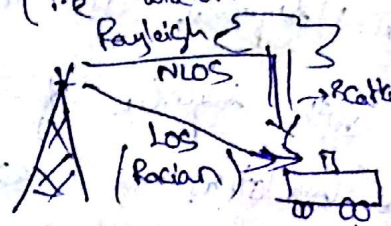
(Time variant factor leads to Rayleigh Phenomenon - called fading)

→ Fading is deviation which effects a signal during Propagation.

→ Caused by interference this is (2) more version of tx signals which arrive at receiver at slight different time.

Part-1:- (System) HW/SW:-

Digital. → A system need to generate an digital data for propagation of information through a wireless medium (i.e wireless device tx data through antenna/etc..,



Exp-1

i.e the digital system for generation of an random data in an sequence. Use a type of Pseudorandom binary sequence known as maximum length sequence (MLS). using maximum linear feedback shift register (flip-flops). which are so called periodic and reproducible freely binary sequence that can be reproduced by shift registers..

i.e for (n) length register Produced sequence of length $(2^n - 1)$

sequence represented as co-efficient of irreducible polynomials in polynomial ring over $\left(\frac{Z}{2Z}\right)$.

Practical applications:- include measuring impulse response. (Eg:- of room reverberation).

used for Direct Sequence Spread spectrum & frequency hopping spread spectrum transmission systems.

n - index time ; k - bit register position.

+ → represents modulo-2 addition.

→ Gold Code :- is also known as Gold sequence is a type of binary sequence used in Tele-Comm (CDMA) & Satellite navigation (GPS)

→ Gold Codes have bounded small Cross Correlations with a set, useful with multiple devices are broadcasting a same range.

→ It Consits of $(2n-1)$ sequence. Each one period of $(2n-1)$

Operation:- 2- maximal length sequences of same length $(2n-1)$ such that absolute Cross Correlation is lessthan equal to $\left(\frac{2^{(n+2)}}{2}\right)$ where 'n' is size of LFSR (linear feedback shift Register) used to generate MLS

→ the Exclusive-ors of 2-gold sequence from same sets is another gold code in same phase

If n is odd $t = \frac{2^{(n+1)}}{2} + 1$

n is even $t = \frac{2^{(n+2)}}{2} + 1$

The Gold sequence formally is an arbitrary phase of sequence in the set $G(u,v)$

$$G(u,v) = \{u, v, u*v, u*Tv, u*T^2v, u*T^{(N-1)}v\}$$

T^k denotes operator which shift vector cyclically to left by 'k' places.

$*$ → Exclusive-OR operation.

u,v → m-sequences of period produced by Primitive Binary Polynomials.

Properties:-

(i) Balanced Property

(ii) Runlength "

(iii) Autocorrelation "