

Information and Communication

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SPCRC Teams for short mugs / Mail for ll long stuff)

TA1: Srikar Kale (MS)

TA2: Shubansh Singhvi (Honors)

M/W/F - 9 AM - 10 AM

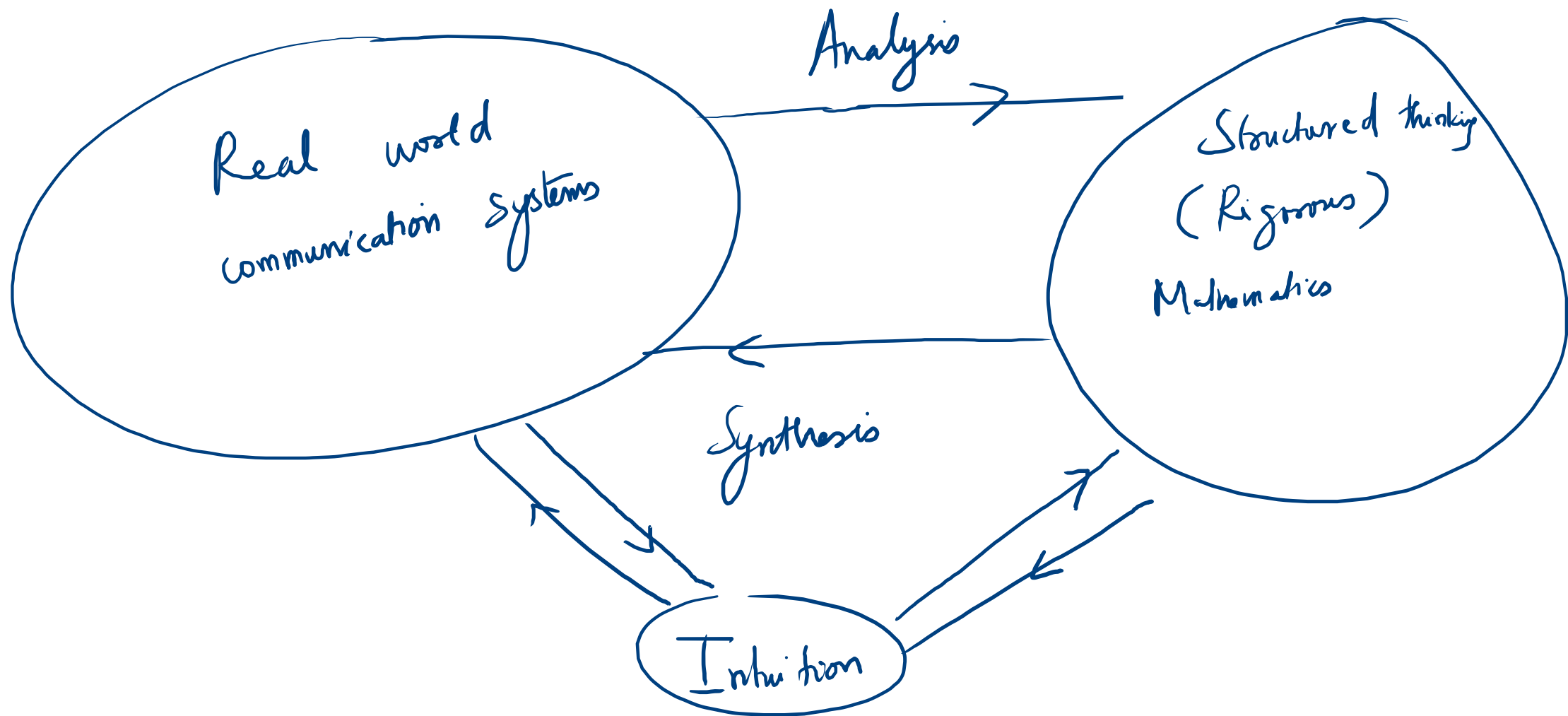
Tut - Tuesdays 9 - 10 AM.

Syllabus - Roughly same as last year

Evaluation / Grading: -

To be announced soon
(Wed).

Communication Theory



Signals :

What is a signal? →

Signals ^{which} carry something 'interesting' to a receiver
are a medium

→ Information in 'transit' is a signal

Examples? →

Sound signal, EM signals,

Digital signals, Morse Code,

Electrical signals,

Optical signals

→ Artificial

Could be artificial /
Could be natural

Note that these signals are in 'time'.

Are there non-time oriented signals?

→ Temperature at various pts in a room

Temperature: $\mathbb{R}^3 \longrightarrow ^\circ\text{C}$ (or $^\circ\text{F}$)

→ Any Image is a signal

Image: $\mathbb{R}^2 \longrightarrow$

parameters regarding
color, brightness, contrast

→ Video (combination of space/time) (R, G, B)

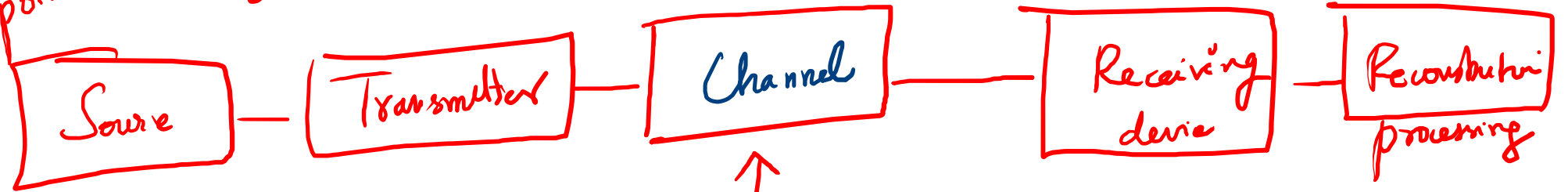
→ Text on a page in a book.

Communication - Transmission, Reception, & Reconstruction of The transmitted signal

26/5

(Information reconstruction)

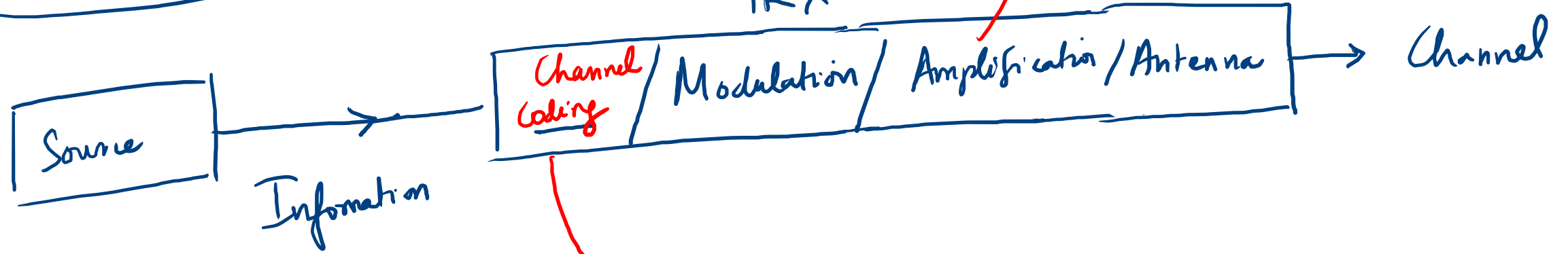
Point-to-point comm system



The part of the
comm system
which is not completely
under our control

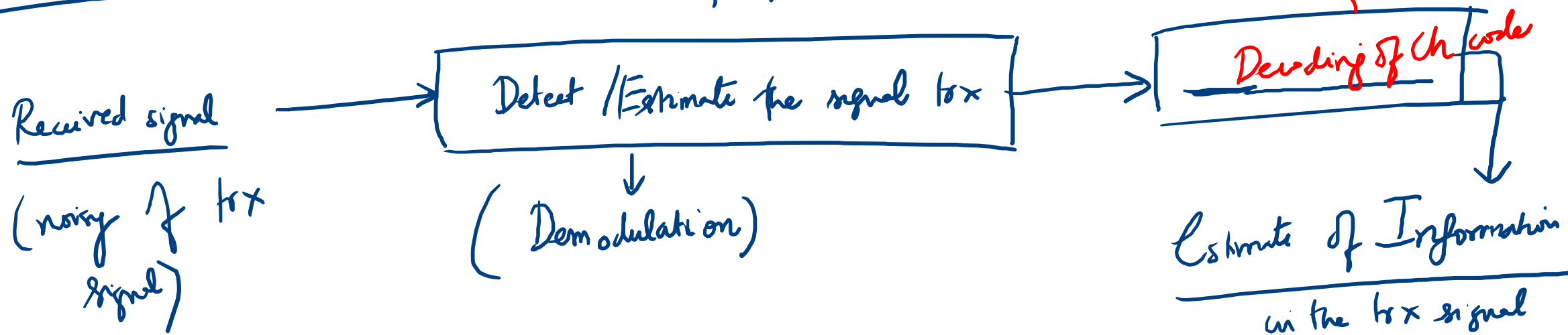
[We may sometimes for the sake of
analysis assume that channel is 'ideal'
[noise free]] ("Channel is Noisy")

Transmitter side:



Power magnification.

Receiver end:



Digital Communication system

What does a end user want from the Comm system?

Point to point

① low prob of error, high fidelity

② High Rate communication.

[③ High Range → this is captured in the channel itself]

④ 'Latency' of communication

→ Time delay b/w transmission & decoding should be small.

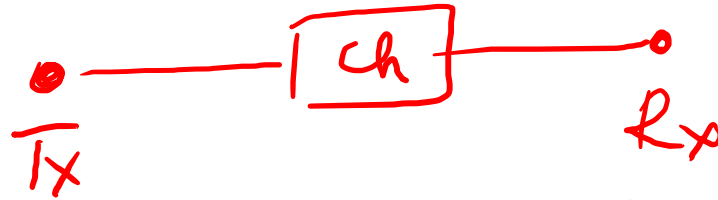
In digital communication,

these two happen via modulation + channel coding

Also in Analog Comm, via intelligent modulation, power control,

Other Comm system models

① Pt - Pt



Wired
eg: Phone call

②

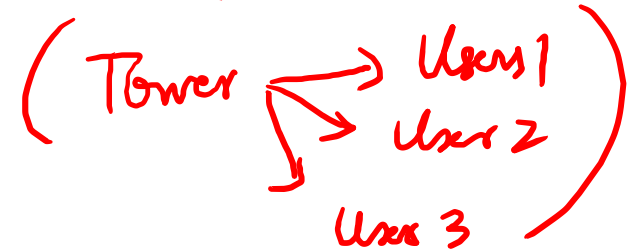
- Rx1
- Rx2
- Rx3
- Rx4

eg: Radio/TV broadcast

: WiFi

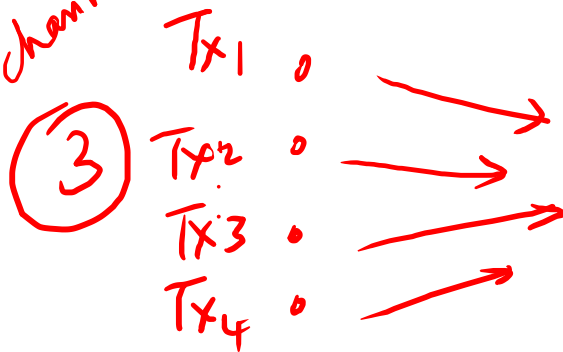
: Wireless Cellular Downlink

Broadcast channel



[Privacy & security in case of independent messages]

Multiple Access channel



• Rx

Eg. Cell phones → Tower [Cellular Uplink]

Clients → Server

(Fairness : Equally supporting all Tx's)

Grading Scheme :-

Quizes :-

70%

1. week of June 7 — 20 %
 2. week of June 21 — 20 %
 3. week of Jul 10 — 20 %
 4. Final Quiz — Jul 26 week — 30 %
- } → Best of 2

Project (Video / Poster preparation) — 15 %

Running component

Course Text / Audio Summaries — 15 %