

Course Contents

1. Introduction and overview of DCS
 2. Review of Signals and Systems
 - Fourier transforms.
 - Sampling and Quantization
 - Correlation (Auto & Cross)
 3. Statistical Modeling of Signals & Noise
 - Random Variable, Random/Stochastic Processes.

Power spectral Density, Stationary R.P., Effect of LTI system on SRP.
 4. Subsystems in a DCS:
 - Formatting - Sampling & Quantization
 5. Modulation └
 - Baseband mod.
 - Bandpass mod.
 6. Demodulation/Detection (Receiver) └
 - Baseband Demod.
 - Bandpass Demod.

- Coherent & Non-Coherent demod.
 7. Fading Channels (if time permits)
- References: 1. Digital Communications: Fundamentals and Applications, Bernard Sklar, 2nd ed.
2. Digital Communications, John Proakis, 4th ed.

Course Evaluation: 1. Mid Sem — 30%
2. End Sem — 40%
3. Regular Lab Submission — 15%
4. Pop Quizzes — 15%

4 pm Wednesday, ←

Email on Wed. by 3:30 pm.

Pop Quizzes on Moodle.

Lab Submissions (16/17 TA's)

5 batches — 64-67

16-17 groups / batch., 3-4 students / group.

- Typically you will get the Lab handout on Monday / Tuesday.
- Wed: 2-4 pm. At least 2 grp members must be present. If Abs. no marks for that lab.
- Each Lab — 10 points
- Deadline for Submitting Code & Report — Friday Evening.

Report must be written in Latex.

Include the Latex src code & figures in the submission folder.

- Plagiarism Check. If found doing plagiarism
 - 1. Loose Marks for 2 labs
 - 2. F grade.

All lab codes must be written in Python3.

- NumPy
- SciPy
- Matplotlib.
- Jupyter notebook

Prelude to the Labs.

82 groups — 325 students

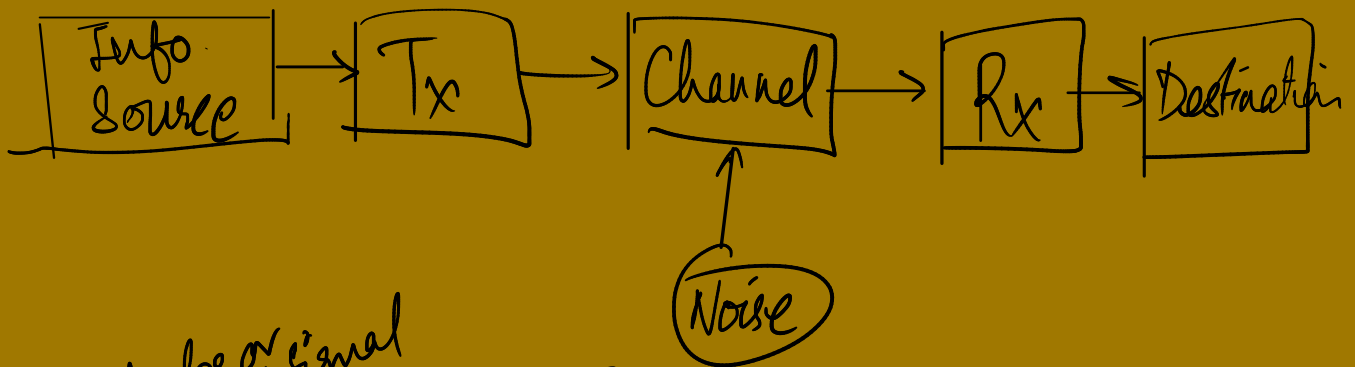
5 teams in TA — Each team has 3-4 TA's.

1 team per batch.

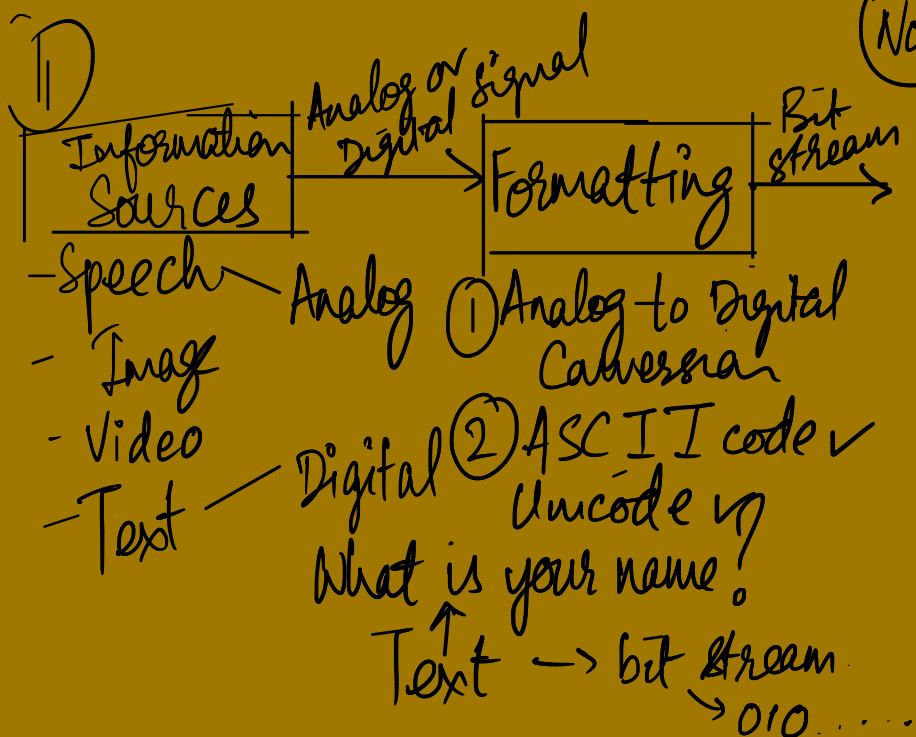
- Latex template will be provided.

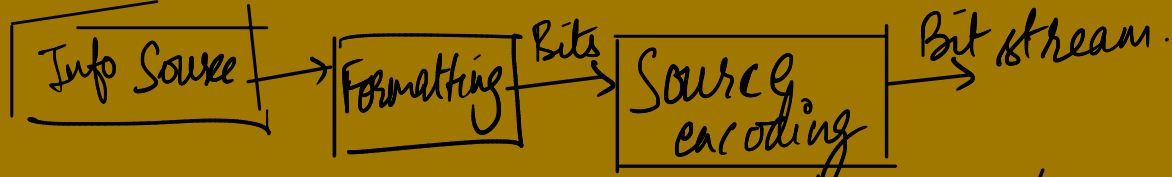
Swift Latex — Latex on Cloud
Collaboration

CS:



①





- Models the bit stream/source as a stochastic process
- Use statistical properties for compression

- Morse code

- JPEG, R G B

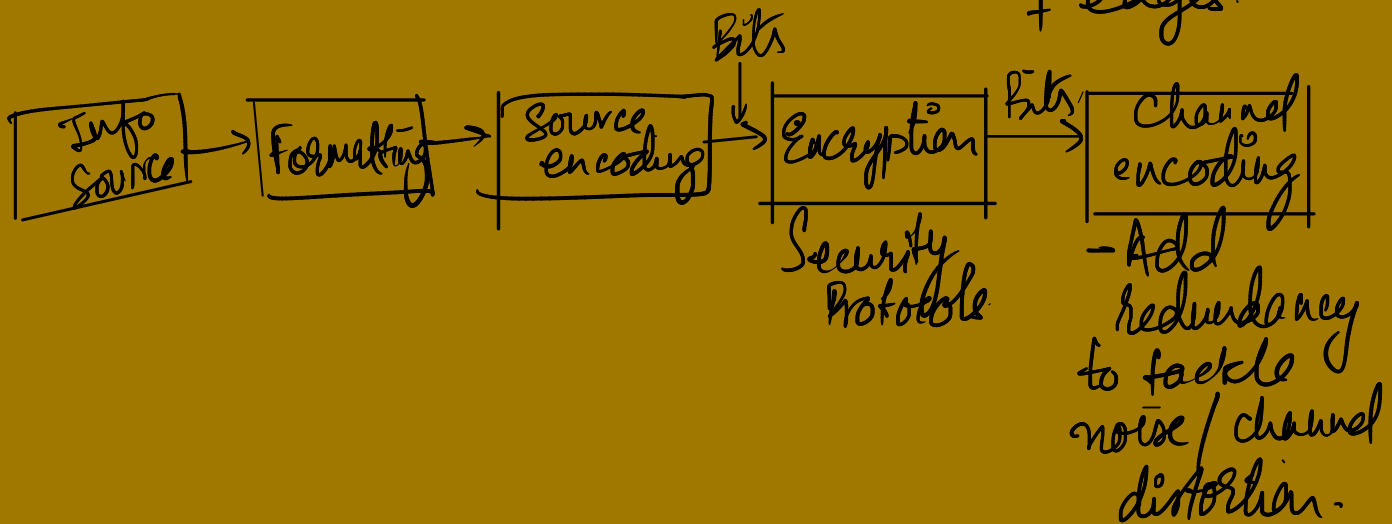
$\downarrow \quad \downarrow \quad \downarrow$
 256 256 256 / pixel
 8b 8b 8b $\sim 24b$ / pixel
 3B

$1024 \times 1024 \rightarrow 1 \text{ Mpixel}$

3MB/image

100KB \sim 500KB

Image \rightarrow Homogeneous reg + edges



eg: 01011 \rightarrow 000 111 000 111 111

