

COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
BA 323 EC321	3	6	2	2	2	3

COURSE AIM

To get the student familiar with different analog and digital communication systems: their block diagrams, modulators and demodulators, identify the difference between continuous and time discrete communications.

COURSE WEEKLY CONTENTS

- Revision. Introduction to communication systems. Linear Modulation / Exponential modulation. Digital modulation basics.
- Week Number 1:* Week Number 2: Linear Modulation: Amplitude modulation (AM) DSB-TC, DSB-SC, Vestigial Side band (VSB)
- Week Number 2:* Generation of (AM) DSB-TC. Detection of (AM) DSB-TC. Generation of (AM) DSB-SC: Product modulator. Balanced modulator. Ring modulator.
- Week Number 3:* Generation of SSB-SC: The frequency discrimination method. The phase discrimination method.
- Week Number 4:* Synchronous detection of Linear Modulation Signals. Effect of phase shift and frequency offset errors.
- Week Number 5:* Frequency Division multiplexing (FDM). QAM. Super heterodyne receivers
- Week Number 6:* Exponential Modulation: FM and PM mathematical analysis, sensitivity and modulation index. FM and PM single tone modulation. Bandwidth and power.
- Week Number 7:* Narrow band NBFM and WBPM. Phasor diagram. WBFM spectrum. Generation of FM. FM Armstrong generation. Detection of FM.
- Week Number 8:* Sampling theorem for low pass signals. Natural sampling relation to PAM. LPF reconstruction.
- Week Number 9:* Practical sampling (Flat top sampling), Reconstruction: S&H circuits. ZOH and FOH filters
- Week Number 10:* Number 11: Analog Pulse Modulation: PAM, PWM and PPM . Bandwidth and power.
- Week Number 11:* Generation of and Conversion among PAM, PWM and PPM. Time-Division Multiplexing (TDM) of PAM, PWM and PPM. BW of PAM.
- Week Number 12:* Baseband Digital Modulation: Pulse coding modulation (PCM), Quantization and coding. Basic PCM waveforms: RB, RZ and NRZ, Manchester code.
- Week Number 13:* Nonlinear PCM generation. Companding (μ -law PCM, A-law PCM)
- Week Number 14:* Differential Modulation: DPCM and Delta Modulation (DM).

Prediction.
Week Number 15: Final Exam.

STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	←	10	MARKS		→	30
		To be freely distributed among possible assessments					
8 to 12	←		20	MARKS		→	20
13 to 15	←		10	MARKS		→	10
16 or 17	40 Final						40
Total	Exams	Assign.	Quizzes	Reports	Present.	Lab.	100

REFERENCES

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| Textbook | • Lathi, B.P. and Zhi Ding "Modern Digital and Analog Communication Systems" 4th Ed. Oxford UN |
| Other | • J. Proakis & M. Salehi "Communication System Engineering" |