

Fourth (4th) Year
Semesters 07/08

COMMUNICATION Option

Course Title: EE313 NETWORK ANALYSIS
Lec. \ Rec. \ Lab. : 03 \ 03 \ 03 Hours per a week:
Class: E07

-COURSE OUTLINE-

1-INTRODUCTION

-Source and passive elements

2-LAPLACE TRANSFORM, POLES AND ZEROS OF A TRANSFER FUNCTION

3-FUNDAMENTAL PROPERTIES OF A TWO-PORT AND MULTI-PORT NETWORKS

- 3-1-Z, Y, h, g and ABCD parameters
- 3-2-Synthesis of lossless two-port networks
- 3-3 -Electric Filters and network interstaging

4-NUMERICAL ANALYSIS OF LINEAR NETWORKS

5-TIME-DOMAIN ANALYSIS OF LINEAR NETWORKS

6- ANALYSIS AND DESIGN BY S-PARAMETERS

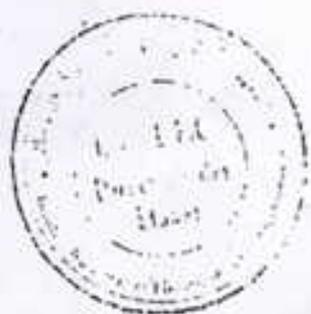
7-NON-LINEAR NETWORK ANALYSIS

8-USE OF SPICE SIMULATOR FOR NETWORK SIMULATION

SPICE is a Simulator Program with Integrated Circuits Emphasis

LABORATORY EXPERIMENTS

- 1-Graph theory.
- 2-Inductance and Capacitance.
- 3-Steady state Response of Second-order systems
- 4-Transient Response of second-order systems.
- 5-Poles & Zeros of passive networks.
- 6-Quality Factor.
- 7-Transfer functions
- 8-Two-port networks.
- 9-Multiport feedback and Biquad Active Filters.
- 10-Butterworth and Chebyshev active Filters.
- 11-Circuits Analysis using SPICE simulator.



Course title: *EE322 Digital Systems II*
 Lec./Rec./Lab.: *3/0/3 Hours per week*
 Class: *E06.*

Course Outline

1- TIMING CIRCUITS

- 1.1- Importance of timing circuits
- 1.2- The 555 internal configuration
- 1.3- The 555 as a monostable
- 1.4- The 555 as an astable: -with DC 50-100%, -with DC 0-100%
- 1.5- The 74121 TTL one-shot
- 1.6- The Schmitt trigger

2- MSI COUNTERS & APPLICATIONS

- 2.1- Unidirectional counters
- 2.2- Programmable bi-directional counters
- 2.3- Design of modulo-N counter using lcs.
- 2.4- Applications

3- MSI REGISTERS & APPLICATIONS

- 3.1- Design of shift registers: -SISO, -SIPO, -PISO, -PIPO
- 3.2- The bi-directional shift register.
- 3.3- The universal shift register
- 3.4- Applications

4- STANDARD COMBINATIONAL MODULES

- 4.1- Binary decoders
- 4.2- Binary encoders
- 4.3- Priority encoders
- 4.4- Multiplexers and Vector Multiplexers
- 4.5- Demultiplexers and Vector Demultiplexers
- 4.6- ROMs
- 4.7- PALs
- 4.8- PLAs
- 4.9- Implementation of Boolean expressions using: -Decoders, -Multiplexers, -ROMs, PALs, PLAs
- 4.10- Comparison of different approaches
- 4.11- Arbitrary waveform generation
- 4.12- Keyboard encoding

5- SEMICONDUCTOR MEMORIES

- 5.1- Tri-state devices and principle
- 5.2- Definitions
- 5.3- A 1-bit memory cell: -Static, -dynamic.
- 5.4- Ram architecture:
- 5.5- ROM: -PROM, -EPROM, -EEPROM
- 5.6- Applications:

6- OPTOELECTRONIC DISPLAYS & CHARACTER GENERATOR

- 6.1- Numerical displays
- 6.2- Ripple blanking
- 6.3- Alphanumeric displays
- 6.4- Applications

7- SYNCHRONOUS SEQUENTIAL SYSTEMS

- 7.1- Sequential systems specifications
- 7.2- State diagram
- 7.3- Mealy and Moore architecture model
- 7.4- Analysis of synchronous sequential systems
- 7.5- Design of synchronous sequential systems
- 7.6- Distinguishable and equivalent states
- 7.7- State minimization procedure

8- DAC & ADC CONVERTERS

- 8.1- Amplitude quantization
- 8.2- Time quantization (Sampling)
- 8.3- Digital-to-Analog Converter
- 8.4- Analog-to-Digital Converter

LAB. EXPERIMENTS

- 1- Counters
- 2- Shift registers
- 3- Encoders/decoders, mux/demux
- 4- Timing circuits
- 5- Memory devices
- 6- A/D and D/A conversion

Course Title : EE402 Linear systems II: Discrete-time Signals and Systems
Lec. / Rec. / Lab. : 03 / 00 / 00 Hours per week
Class: E07

Course Outline

Chapter 1: Discrete-time Signals and systems

- 1.1: Review of the properties of discrete time signals
- 1.2: Basic discrete-time signals
- 1.3: Brief Review of the properties of continuous time Linear time- invariant systems

Chapter 2: Discrete -time Linear time-invariant systems

- 2.1: Representation of signals in terms of impulses
- 2.2: Discrete-time LTI systems: The convolution Sum
- 2.3: Properties of the convolution operator
- 2.4: Properties of Linear Time-Invariant Systems:
 - Impulse response and step response
 - Causality, stability, and interconnections of discrete- time LTI systems
- 2.5: Discrete- time systems described by constant coefficients Difference equations:
- 2.6: Poles and zeros of discrete-time LTI systems
- 2.8: Determination of the complete response of LTI systems to given input signals: Methods of solving linear constant coefficients Difference equations
- 2.9: Block-Diagram Representations of LTI systems Described by linear constant coefficients difference equations

Chapter 3: Fourier Analysis for discrete-time signals and systems

- 3.1: Response of discrete-time LTI systems to complex exponentials
- 3.2: Discrete-time Fourier series representation of periodic signals
- 3.3: Discrete-time Fourier transform of aperiodic signals
- 3.4: Discrete-time Fourier transform of periodic signals
- 3.5: Properties of the Discrete -time Fourier Transform and the inverse Fourier Transform
- 3.6: Polar representation of Discrete-time Fourier transform
- 3.7: The frequency response of systems characterised by linear constant-coefficient difference equations
- 3.8: First-Order and Second-Order systems
- 3.9: Determination of the Transfer function, the impulse response, and steady state response from the frequency response

Chapter 4: The Z-Transform

- 4.1: Definition of the Z-transform of a discrete-time signal
- 4.2: The region of convergence of the Z-transform
- 4.3: The Inverse Z-transform
- 4.4: Geometric evaluation of the Fourier Transform from the Pole-Zero Plot
- 4.5: Properties of the Z-Transform
- 4.6: Analysis and characterisation of LTI systems using Z-transform
- 4.7: The unilateral Z-transform

- LAB EXPERIMENT -

1. Spectrum analysers.
2. AM spectra
3. Amplitude modulation.
4. Amplitude demodulation.
5. Radio receiver.
6. FM spectra.
7. Frequency modulation.
8. FM demodulation.
9. Pulse modulation.

COURSE TITLE : EE411 COMMUNICATION I
Lec / Rec/ Lab : 03 / 00 / 03 hours per a week
Class : E07

- COURSE OUTLINE -

1. INTRODUCTION TO SIGNALS.
 - 1.1- Classes of signals.
 - 1.2- The phasor.
 - 1.3- Periodic signals & fourier series
 - 1.4- The fourier transform.
 - 1.5- Linear time invariant systems
 - 1.6- Single sided spectra & Analytic signals.
2. CONTINUOUS WAVE MODULATION.
 - 2.1- General introduction to modulation
 - 2.2- Linear modulation
 - 2.3- AM
 - 2.4- DSB-SC
 - 2.5- SSB
 - 2.6- VSB
 - 2.7- Exponential modulation.
 - 2.8- FM & PM
3. PULSE MODULATION
 - 3.1- The sampling theorem.
 - 3.2- PAM
 - 3.3- PDM.
 - 3.4- PPM.
 - 3.5- PCM & Signal to noise ratio
4. INTERFERENCES IN CW & PULSE MODULATION.
5. EXAMPLES OF SOME COMMUNICATION SYSTEMS.
 - 5.1- Compatible stereo FM.
 - 5.2- The T.V. signal.

Course title: *EE421 Computer Architecture*
Lec./Rec./Lab.: *3/0/0 Hours per a week*
Class: *E07.*

Course Outline

1-BASIC COMPUTER ARCHITECTURE

- 1.1- Introduction to assembly language
- 1.2- Introduction to computer architecture
- 1.3- Basic building blocks of computer design
- 1.4- Bus structures
- 1.5- Data representation: - data types, - floating-point arithmetic

2- REGISTER TRANSFER LANGUAGE

3- ESSENTIALS OF COMPUTER SOFTWARE

- 3.1- Instruction format
- 3.2- VAX instruction format
- 3.3- Addressing modes
- 3.4- Example programs

4- CPU STRUCTURE

- 4.1- Basic CPU architecture
- 4.2- CPU operation
- 4.3- Implementing complete instructions
- 4.4- RISC

5- THE ALU STRUCTURE AND OPERATION

- 5.1- Computer addition and subtraction
- 5.2- Multiplication and division
- 5.3- Shift instructions
- 5.4- Bit manipulation

6- MICROPROGRAMMING

- 6.1- What is microprogramming ?
- 6.2- Microprogramming examples
- 6.3- Microprogram branching

7- MEMORY STRUCTURE

- 7.1- Memory devices
- 7.2- Memory organization: - bank, - interleaved
- 7.3- Cache memory
- 7.4- Mapping functions: - direct mapping, - associative mapping, - block-set associative mapping
- 7.5- Virtual memory

8- THE I/O SYSTEM

- 8.1- Addressing I/O devices
- 8.2- Data transfer: - Program-controlled I/O, - DMA, - I/O channel
- 8.3- Interrupt-driven I/O
- 8.4- Queue I/O
- 8.5- Advanced I/O devices: - disk drives, -tapes

9- MICROPROCESSORS

- 9.1- Microprocessors characteristics
- 9.2- General microprocessor architecture
- 9.3- The Motorola family
- 9.4- The Intel family

10- LARGE SYSTEM ARCHITECTURE

- 10.1- Architecture classification:
- 10.2- Pipeline structures
- 10.3- Array structures
- 10.4- Multiprocessors

11- FAULT-TOLERANT COMPUTER ARCHITECTURE

- 11.1- Reliability measures
- 11.2- Hardware redundancy
- 11.3- Static, dynamic, hybrid

Course title : EE462 *ELECTROMAGNETIC FIELDS II*
Lec./ Rec./ Lab : 03 Hours / 00H / 00 hour per a week.
Recommended textbook: " Electromagnetic wave & Radiating systems" -JORDAN-
Class : EO7

- COURSE OUTLINE -

- 1- BOUNDARY CONDITIONS
- 2- WAVE PROPAGATION AND ENERGY FLOW
- 3- REFLECTION & REFRACTION OF PLANE WAVES
- 4- GUIDED WAVES
- 5- TRANSMISSION LINES
- 6- SMITH CHART
- 7- RECTANGULAR WAVE GUIDES
- 8- RADIATIONS.

Course title : EE412 Antennas & Radio waves propagation
 Lec. Rec. Lab. : 03h \ 00h \ 00hours Per a week
 Class : EO8

- COURSE OUTLINE -

1- INTRODUCTION

2- BASIC ANTENNA AND CONCEPTS

2.1. Definitions

2.2. Antenna parameters

2.2.1. Basic parameters

2.2.2. Patterns

2.2.3. Beam area

2.2.4. Radiation intensity

2.2.5. Beam efficiency

2.2.6. Directivity

2.2.7. Directivity and gain

2.2.8. Directivity and resolution

2.3. Aperture parameters

2.3.1. Aperture concept

2.3.2. Effective apperture

2.3.3. Scattring aperture

2.3.4. Loss aperture

2.3.5. Collecting aperture

2.3.6. Aperture efficiency

2.3.7. Effective height

2.3.8. Effective aperture and Directivity

2.4. Friis Transmission formula

2.5. Sources of Radiation

2.5.1. Radiation results from accelerated charge

2.5.2. Fields from oscillating dipole

2.6. Wave polarization



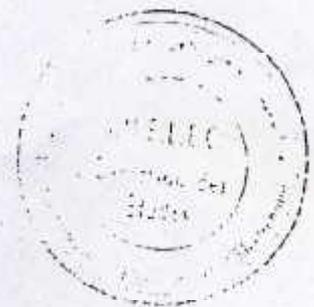
3- POINT SOURCES

- 3.1. Power patterns
 - 3.1.1. Source with unidirectional cosine power
 - 3.1.2. Source with sine power pattern
 - 3.1.3. Source with sine squared power pattern
 - 3.1.4. Source with unidirectional cosine squared power pattern
 - 3.1.5. Source with unidirectional power pattern that is not symmetrical
 - 3.2. Directivity
 - 3.3. Field patterns
 - 3.4. Phase patterns
- * Exercices & problem

4- ARRAYS OF POINT SOURCES

- 4.1. Arrays of 2 isotropic point source
 - 4.1.1. Two(2) isotropic point sources of same amplitude and phase
 - 4.1.2. Two(2) isotropic sources with identical amplitudes and any phase difference
 - 4.1.3. Two(2) isotropic point sources with unequal amplitude and any phase difference
- 4.2. Non isotropic similar point sources
 - 4.2.1. Pattern multiplication principle
- 4.3. Non isotropic and Dissimilar point sources
- 4.4. Linear arrays
 - 4.4.1. Uniform linear array
 - 4.4.2. Broadside array (sources in phase)
 - 4.4.3. Ordinary end-fire array
 - 4.4.4. End-fire array with increased directivity
 - 4.4.5. Scanning array
 - 4.4.6. Null directions for arrays of n isotropic sources
 - 4.4.7. Broadside versus end-fire array
 - 4.4.8. Uniform tow directional array
- 4.5. Linear arrays with non uniform distribution
 - 4.5.1. Fourier series method
 - 4.5.2. Binomial method
 - 4.5.3. Chebyshev art

* Exercices & problems



5-THE ELECTRIC DIPOLE AND THIN LINEAR ANTENNAS

5.1.The short dipole

5.1.1. Definition

5.1.2. Vector and scalar potentials

5.1.3. The fields of a short dipole

5.1.4. The average poynting vector and power radiation

5.2. Thin linear antenna

5.3. Radiation resistance of (LANDA/2) antenna

5.4. Radiation resistance at a point which is not a current Max

* Exercices & problems

6-REFLECTION ANTENNAS

6.1. Concept

6.2. The parabola - General properties.

* Exercices & problems

7- PROPAGATION OF RADIO WAVES



Course title: *EE 413 Digital Signal Processing*
Lec./Rec./Lab. : *3/0/0 Hours per a week*
Class: *E08*

Course Outline

1-GENERALITIES ABOUT SIGNALS

2-SEQUENCES AND SYSTEMS

- 2.1-Fourier Transform
- 2.2 -The Sampling Theorem

3-THE Z- TRANSFORM

- 3.1-Definitions & general properties
- 3.2-System Function
- 3.3-Geometric Evaluation of Fourier Transform
- 3.4-Digital Resonator
- 3.5-Digital Oscillator
- 3.6-Basic Filters

4-PROPERTIES OF ANALOG FILTERS

- 4.1-Ideal Frequency-Domain Filter Models
- 4.2-General Approaches
- 4.3-Butterworth Approximation
- 4.4-Chebyshev Approximation
- 4.5-Low-Pass to Band-Pass Transformation
- 4.6-Low-Pass to Band-Rejection Transformation
- 4.7-Low-Pass to High-Pass Transformation

5-SIGNAL FLOW GRAPHS AND IMPLEMENTATION

- 5.1-Generalities about Digital Filter Structure
- 5.2-The Signal Flow Graph
- 5.3-Matrix representation and Analysis
- 5.4-State Space Representation of Digital Filters
- 5.5-Some Particular Structures (Direct Form I, II, Canonic, Cascade,)
- 5.6-Finite Impulse Response (FIR) Filters Structures
 - The linear Phase FIR Filter
 - Polynomial Interpolation Structures
 - Frequency Sampling Structures
- 5.7-Implementation of Digital Filters
 - Software Implementation (Vax/Basic & Vax/Fortran)
 - Hardware Implementation
- 5.8-Effect of the Parameter Quantization on Filter Performance

6-DESIGN OF DIGITAL FILTERS

6.1-General Problem of Design

6.2-An Introduction to Approximation (Least square, Min-Max,)

6.3-Infinite Impulse Response (IIR) Filter Design

-The Mapping of Analog Designs (Impulse Invariance, Bilinear Transform,...)

-Direct Design (Inverse Least Square Design)

-Examples of Design

7-DISCRETE AND FAST FOURIER TRANSFORMS

7.1-Forms of the Fourier Transform

7.2- Discrete Fourier transform (DFT)

7.3- Fast Fourier transform (FFT)

8-A-APPLICATIONS OF THE DISCRETE FOURIER TRANSFORM

8.1-Approximation of Continuous-Time Transforms with DFT

8.2-Selection of DFT or FFT Parameters

8.3-Convolution with the FFT

8.4-Power Spectrum

9- APPLICATIONS OF DIGITAL SIGNAL PROCESSORS

E422 Microprocessors System Design

Textbook: The Z-80 Microprocessor
Ramesh S. Gaonkar, 3rd Edition.

Lec./Lab./Credit Hours: (3, 3, 4)

Topics

1. Introduction to Microprocessors
 - Microprocessor History and Evolution
 - Microcomputers and Large Frame Systems
 - Microprocessor-Based Systems Architecture
2. Microprocessor Architecture
 - General computer architecture
 - The MPU
 - Input/Output
 - A Comparison of Typical Microprocessors
3. The Z-80 Microprocessor
 - MPU Signal Description
 - Programming Model
 - Memory and I/O Interfacing
4. Z-80 Assembly Language Programming
 - Instruction Set and Machine Language Programming
 - Addressing Modes
 - Introduction to Z-80 Assembly Language and Programming
 - Assemblers and Software Development Tools
 - Stacks and Subroutines
 - Programming Examples
5. Memory Interfacing
 - MPU Timing Diagrams
 - Timing Considerations of Memory Devices
 - Memory Organization and Address Decoding
 - Memory Expansion
 - MT-80AZ Memory Map
6. I/O Interfacing
 - Interrupt Handling Techniques
 - Simple Input/Output Devices
 - I/O Device selection
 - Programmable Interface Devices:
 - Intel PPI 8255
 - Zilog Parallel Input Output (PIO)
 - Zilog Counter Timer Circuit (CTC)

7. Direct Memory Access
 - DMA Concepts
 - The Z-80 DMA Structure

8. Microprocessor-Based Communications
 - Introduction to Digital Communication
 - Serial Communication Interface Adapter: The MC6850
 - RS232 C Interface Standard
 - Modems

9. Designing Microprocessor-Based Systems
 - Application Examples

10. Trends in Microprocessors Technology

LAB. EXPERIMENTS

- 1- Getting Familiar with the MT-80AZ Microcomputer
- 2- Arithmetic Operations
- 3- Data Conversion and Manipulations
- 4- Event Counting and Interrupt Handling
- 5- I/O Interfacing through the 8255 PPI
- 6- Waveform Generation (DACs Interfacing)
- 7- Data Acquisition (ADC Interfacing)

COURSE TITLE : EE441 COMMUNICATION CIRCUITS
Lec./ Rec./Lab. : 03 / 00 / 03 hours per a week.
Class : EOS

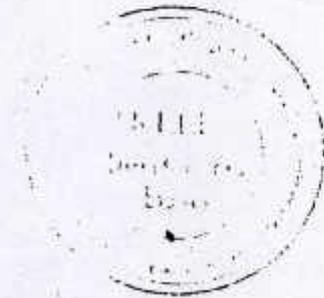
- COURSE OUTLINE -

1. BRIEF REVIEW OF ACTIVE DEVICES.
2. RLC CIRCUITS AND PASSIVE COUPLING NETWORKS.
 - 2.1- General series // Impedance transformation.
 - 2.2- Transformers.
 - 2.3- Transformer like networks
3. NON LINEAR CONTROLLED CURRENT SOURCES
 - 3.1- Piece wise linear characteristic
 - * Different classes
 - 3.2- Exponential characteristic.
 - 3.3- Square law characteristic
 - 3.4- Series resistor with exponential.
 - 3.5- Clamp biased square law.
 - 3.6- Differential pair.
 - 3.7- Resistively biased exponential.
4. OSCILLATORS. (SINUSOIDAL)
 - 4.1- Basic differential equation.
 - 4.2- The Barkhausen condition.
 - 4.3- LC type of oscillator.
(Describing function type of analysis)
 - 4.4- Bridge oscillators.
 - 4.5- Frequency stability.
 - * Direct
 - * Indirect.
5. THE SUPERHETERODYNE RECEIVER.
 - 5.1- Generalities.
 - 5.2- The mixer.
 - 5.3- Diode mixers.
 - 5.4- Active device mixers.
 - 5.5- R.F & IF amplifier.
 - 5.6- Need for small signal analysis.
 - 5.7- Noise analysis of R.F amplifier.
 - 5.8- Distorsion analysis (3rd order IMD)



- LABORATORY EXPERIMENTS -

1. Low frequency and wide band Transistor
2. Wien bridge oscillators.
3. L.C. oscillators.
4. Crystal oscillators.
5. Mixer circuits.
6. Transmitter circuits.



COURSE TITLE: *EE511 SIGNAL TRANSMISSION* (Digital communications)
Lec/Rec/Lab. : 03 / 00 / 00 hours per a week.
Class:EO9

- COURSE OUTLINE-

1. REVIEW OF PROBABILITY.

- 1.1- Sample space and basic axioms.
- 1.2- Bayes rule. The MAP concept
- 1.3- The random variable.
A communication example (ML)
- 1.4- Stochastic processes.
- 1.5- General definitions.
- 1.6- 2nd order statistics.
Power spectrum density.

2. BASEBAND DIGITAL COMMUNICATION.

- 2.1- General distortionless transmission.
- 2.2- Signal to noise ratio.
- 2.3- Wideband pulse transmission
The matched filter.
- 2.4- Bandlimited transmission.
Nyquist criteria.

3. DIGITAL MODULATION TECHNIQUES.

- 3.1- Digital modulation Spectra.
ASK, PSK, FSK.
- 3.2- Probability of error for
ASK, PSK, FSK. in coherent and non coherent receivers

4. INFORMATION THEORY AND CODING.

- 4.1- Basic definition.
- 4.2- Noisy channel theorem.
- 4.3- General definition about codes.
- 4.4- Linear codes
syndrome decoding.



Fifth (5th) Year
Semesters 09/10

COMMUNICATION Option

Course title : EE512 *MICROWAVE COMMUNICATIONS*

Lec / Rec. / Lab.: 03 / 00 / 03 hours . Per week

Recommended book: - Microwave Communications"

- Diogeris J. Angelakos

- Thomas E. Everhart.

Class : EO9

COURSE OUTLINE

1- THE SYSTEM'S CONCEPT

- 1.1- Introductio
- 1.2- A general Communication System
- 1.3- Specific systems
- 1.4- The Frequency Spectrum.

2- ELECTROMAGNETIC FIELDS AND POWER

- 2.1- Introduction
- 2.2- Electromagnetic wave propagation
- 2.3- Guided Transverse Electromagnetic waves
- 2.4- Wave guides
- 2.5- Electromagnetic Energy propagation.

3- MICRO WAVE AMPLIFIERS AND OSCILLATORS

- 3.1- Introduction
- 3.2- High-Frequency limitations of conventional tubes
- 3.3- Induced Cirrent
- 3.4- Transit-Time Effects in Space-Charge controlled tubes.
- 3.5- Klystrons
- 3.6- Velocity Modulation by a Gridded Cavity Gap
- 3.7- The two-Cavity Klystrom
- 3.8- The Reflex Klystrom
- 3.9- Traveling-ware Tubes

4- PRINCIPLES OF SOLID- STATE MICROWAVE DEVICES.

- 4.1- Introduction
- 4.2- The tunnel diode
- 4.3- Parametric Amplifiers
 - *The Manley-Rowe relations
 - * Methods of Analysis.
 - * The parametric μp -Converter

- 4.4- Masers
- *The Laser

5- ANTENNAS

- 5.1- Introduction
- 5.2- Types of Antenna Problems
- 5.3- Elemental Dipole Antenna
- 5.4- Energy Flow and Power Patterns
- 5.5- Wire Antennas
- 5.6- Antennas Arrays
- 5.7- Aperture-type Antennas
- 5.8- Reflectors for a Given polar diagram
- 5.9- Impedance of Transmitting Antennas
- 5.10- Receiving Antennas
- 5.11- Special Reflector-type Antennas used in Micro wave
- 5.12- Frequency independent Antennas

6- PROPAGATION OF RADIO WAVES

- 6.1- Introduction
- 6.2- The Ground-wave set
- 6.3- Tropospheric wave
- 6.4- Sky-wave propagation
- 6.5- Radio-wave Absorption in Atmospheric Gases.

7- NOISE

- 7.1- Introduction
- 7.2- Characteristic of Noise sources
- 7.3- Thermal Noise
- 7.4- Shot Noise
- 7.5- Amplitude Characteristics of White Noise
- 7.6- Noise Figure
- 7.7- Antenna Noise
- 7.8- Communication System Noise Model

8- SPECIFIC MICROWAVE COMMUNICATION SYSTEMS

- 8.1- Introduction
- 8.2- Radar System.

Course title : E513 RADAR & TELEVISION
Lec./Rec./Lab. : 03 / 00 / 03 hours. Per week.
Class : EO10

- COURSE OUTLINE -

- 1- T.V. PRINCIPLES, GENERALITIES AND EXAMPLES OF THE FAULTY SECTIONS.
- 2- BLACK AND WHITE TV TROUBLESHOOTING
 - 2-1- CRT and its auxilliary circuits
 - 2-2- Power supply
 - Linear regulated power supply
 - Switched mode power supply
 - 2-3- The time base
 - Horizontal synchronisation
 - Vertical synchronisation
 - 2-4- The reception circuits
 - TUNER
 - IF circuit
- 3- COLOR SYSTEMS (PAL, SECAM, ...)
- 4- COMPOSITE VIDEO SIGNAL
- 5- PICTURE CARRIER AND TV CHANNEL
- 6- THE COLOR TV AND FAULT DIAGNOSTIC
- 7- INTRODUCTION TO NUMERICAL TELEVISION
- 8- STUDIES OF SPECIAL TOPICS RELATED TO THIS FIELD

- LABORATORY EXPERIMENTS -

- I-Functional Analysis of Black and White T.V
- II-Troubleshooting of Black and White TV: MT1-44.ENIE
- III-Demonstration on COLOR TV: CT2.CT4.ENIE



COURSE TITLE: EE515 LASERS & OPTICAL FIBERS.
Lec. / Rec. / Lab. / : 03 hours / 00 h / 00 hours per a week
Class:EO9

COURSE OUTLINE

1. INTRODUCTION.
2. BASIC SEMICONDUCTOR PROPERTIES OF III-V COMPOUNDS USED FOR OPTOELECTRONICS DEVICES.
3. SEMICONDUCTOR HOMOJUNCTIONS (PN) AND HETEROJUNCTIONS (ISOTYPE & ANISOTYPE).
4. OPTICAL DETECTORS:
 - 4.1- Photoconductors.
 - 4.2- Photodiode detectors
 - 4.2.1- PN junction photodiode.
 - 4.2.2- PIN photodiode.
 - 4.2.3- Avalanche photodiode.
5. OPTICAL SOURCES :
 - 5.1- Light emitting diodes (LED's)
 - 5.1.1- Basic principles.
 - 5.1.2- Light emitting diodes for optical communication.
 - 5.2- Laser diodes (LD's).
 - 5.2.1- Basic principles of laser action.
 - 5.2.2- Semiconductor lasers.
 - 5.2.3- Semiconductor lasers for optical communication systems.
 - 5.3- Receiver Amplifier.
6. OPTICAL FIBRES.
 - 6.1- Elementary discussion of propagation in dielectric waveguide
 - 6.2- Material dispersion.
 - 6.3- Total dispersion in multimode and monomode fibers.
 - 6.4- Attenuation mechanisms in optical fibers.
 - 6.5- Fabrication of fibers, cables and passive components.



7. OPTICAL COMMUNICATION SYSTEMS.

- 7.1- The regeneration of digital signals.
- 7.2- Coherent systems.
- 7.3- Unguided optical communication system.
- 7.4- Guided fibre optical communication system.

8-PRESENTATION OF SPECIAL TOPICS RELATED TO THIS COURSE.

COURSE TITLE : EE544 HIGH FREQUENCY AMPLIFIERS

Lec./Rec./Lab. : 03/00/00 hours per a week

Class: EO10

- COURSE OUTLINE -

1. INTRODUCTION.

- 1.1- Planar transmission lines.
- 1.2- Electromagnetic waves and circuit analyses.
- 1.3- MIC's and MMIC's technology.

2. SOME CIRCUIT THEORY FOR WAVEGUIDING STRUCTURES.

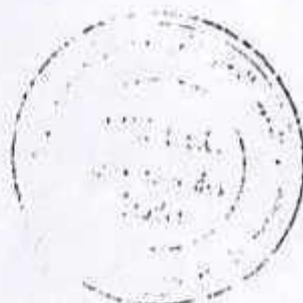
- 2.1- Two-port junctions.
- 2.2- Some equivalent two port circuits.
- 2.3- Scattering matrix formulation.
- 2.4- Symmetry of scattering matrix.
- 2.5- Scattering matrix for a lossless junction.
- 2.6- Scattering matrix for a TP junction.
- 2.7- Transmission matrix representation.
- 2.8- Signal flow graphs.
- 2.9- Generalized scattering matrix for power waves.

3. IMPEDANCE TRANSFORMATION AND MATCHING.

- 3.1- Smith chart.
- 3.2- Single stub and double stub matching.
- 3.3- Impedance matching with lumped elements.
- 3.4- Design of complex impedance terminations.
- 3.5- Quarter wave transformers.

4. SOLID STATE AMPLIFIERS.

- 4.1- BJT & FET biasing.
- 4.2- Amplifier design using scattering parameters.
- 4.3- Amplifier power gain.
- 4.4- Stability criteria.
- 4.5- Constant power gain circles.
- 4.6- Low noise amplifier design.
- 4.7- Constant mismatch circles.
- 4.8- Microwave amplifier design (single stage & second stage for a two stages amplifier).



5. PARAMETRIC AMPLIFIERS.

- 5.1- PN junction diodes.
- 5.2- Negative resistance parametric amplifier.
- 5.3- Noise properties of a parametric amplifier.

PARTS TO BE ADDED TO THIS COURSE :

1. PASSIVE MICROWAVE DEVICES.

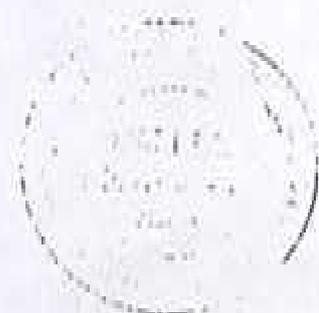
- 1.1- Terminations.
- 1.2- Attenuators.
- 1.3- Phase shifters.
- 1.4- Directional couplers.
- 1.5- Power dividers.
- 1.6- Introduction to resonators.

2. MICROWAVE FILTERS.

- 2.1- Introduction to microwave filters.
- 2.2- Image parameters, method of filter design.
- 2.3- Some low pass filters design.
- 2.4- Frequency transformation.
- 2.5- Microstrip half-wave filter.
- 2.6- Other types of filters.

3. OSCILLATORS & MIXERS.

- 3.1- Gunn oscillator.
- 3.2- Impatt diodes.
- 3.3- Transistor oscillator.
- 3.4- Oscillator circuits & design.
- 3.5- Mixers, linear & nonlinear operation.
- 3.6- Balanced mixers.
- 3.7- Mixer analysis using harmonic balancing.



22532

Course title: *Quality Control*
 Lec./Rec./Lab. :3/0/0 Hours per week
 Class: E10

Course Outline

1-NATURE AND SCOPE

- 1.1-Introduction
- 1.2-Definitions
- 1.3-Quality control functions
- 1.4-Relationship to Reliability

2-ORGANIZATION

- 2.1-Purpose of Organising
- 2.2-Location within the Total Enterprise
- 2.3-Internal Organisation of the Quality Control

3-PERSONNEL

- 3.1-Introduction
- 3.2-Labor
- 3.3-Engineering and Scientific personnel
- 3.4-Supervisory and Management Personnel

4-TRAINING

- 4.1-Training for Labor Positions
- 4.2-Training for Engineering and Scientific Employees
- 4.3-Training for Supervisory and Management Personnel

5-QUALITY SYSTEMS AND PROCEDURES

- 5.1-Requirements for Systems and Procedures
- 5.2-Systems and Procedures Defined
- 5.3-Systems and Procedures Analysis
- 5.4-The Quality Control Manual

6-QUALITY COSTS

- 6.1-Introduction
- 6.2-Classes Of the Firm's Costs
- 6.3-Quality Costs and Losses
- 6.4-Implementation
- 6.5-Accounting for Quality Costs and Losses

7-QUALITY MOTIVATION

- 7.1-Introduction
- 7.2-Elements of Motivation Program
- 7.3-Motivation and Quality Control

