Distance Education Programme in
Electronics and Communication Engineering
Andhra University
Scheme, Syllabus and Examinations Programmed by the
Department of Electronics and Communication Engineering

B.E. (ECE), I - Year

Code	*Subject*	*Duration of Exam*	*Max. Marks*
DMECE 101	Mathematics 1	3 hrs	100
DMECE 102	Mathematics II	3 hrs	100
DMECE 103	Physics	3 hrs	100
DMECE 104	Chemistry	3 hrs	100
DMECE 105	Computer Programming and Numerical Techniques	3 hrs	100
DMECE 106	Material Science	3 hrs	100
DMECE 107	Electronics I	3 hrs	100
DMECE 108	Physics Lab	3 hrs	100
DMECE 109	Chemistry Lab	3 hrs	100
DMECE 110	Computer Programming Lab	3 hrs	100
		Total	1000

B.E. (ECE), II - Year

Code	*Subject*	*Duration of Exam*	*Max. Marks*
DMECE 201	Mathematics III	3 hrs	100
DMECE 202	Elements of Electrical Mechanics	3 hrs	100
DMECE 203	Electronics II	3 hrs	100
DMECE 204	Network Theory	3 hrs	100
DMECE 205	Mechanics and Strength of Mechanics	3 hrs	100
DMECE 206	EMF Theory	3 hrs	100
DMECE 207	Signals and Systems	3 hrs	100
DMECE 208	Electronic Measurements and Instruments	3 hrs	100
DMECE 209	Electronics I Lab	3 hrs	100
DMECE 210	Electrical Machines Lab	3 hrs	100
		Total	1000

B.E. (ECE), III Year

Code	*Subject*		*Duration of Exam*	*Max. Marks*
DMECE 301	Antennas and Propagation		3 hrs	100
DMECE 302	Digital Signal Processing		3 hrs	100
DMECE 303	Switching and Logic Circuits		3 hrs	100
DMECE 304	Analog Communication		3 hrs	100
DMECE 305	Control System Engineering		3 hrs	100
DMECE 306	Microprocessor and Microcontrollers		3 hrs	100
DMECE 307(A)	Passive and Active Filter Design	Elective – I	3 hrs	100
DMECE 307(B)	Computer Architecture and Organization		3 hrs	100
DMECE 307(C)	EMI / EMC		3 hrs	100
DMECE 308	Linear and Digital ICs Circuits and Applications		3 hrs	100
DMECE 309	Analog Communication Lab		3 hrs	100
DMECE 310	Electronics – II Lab		3 hrs	100
DMECE 311	Linear and Digital IC Lab		3 hrs	100
			Total	1100

Elective I :

DMECE 307 (a) Passive and Active Filter Design
(b) Computer Architecture and Organization
(c) EMI / EMC

B.E. (ECE), IV Year

Code	*Subject*		*Duration of Exam*	*Max. Marks*
DMECE 401	Radar Engineering and Navigational Aids		3 hrs	100
DMECE 402	TV and Satellite Communication		3 hrs	100
DMECE 403	Digital Communication		3 hrs	100
DMECE 404	Fundamentals of Environmental Engg		3 hrs	100
DMECE 405	Engineering Economics & Management		3 hrs	100
DMECE 406	Microwave Engineering		3 hrs	100
DMECE 407(A)	Cellular and Mobile Communications	Elective II	3 hrs	100
DMECE 407(B)	VLSI Design Techniques		3 hrs	100
DMECE 407(C)	Fibre Optic Communication		3 hrs	100
DMECE 408	Microwave and Digital Communication Lab		3 hrs	100
DMECE 409	Microprocessor Lab		3 hrs	100
DMECE 410	Project		Vivavoce	200
			Total	1100

Elective II

DMECE 407 (a) Cellular and Mobile Communications
(b) VLSI Design Techniques
(c) Fibre Optic Communication

B.E. 4/4 ECE
DISTANCE MODE
SYLLABUS

DMECE 401 : Radar and Navigational Aids

Unit – 1 : Introduction of the Radar, Radar Parameters and Definitions

Information given by the radar, Applications of the Radar, Nature and types of radars, radar frequency bands, different types of electromagnetic sensors, brief history of radars, radar parameters and definitions

Unit – 2 : Basic Radars

Principle of basic radar, simple block diagram of radar, radar range equations, basic pulsed radar, CW radar, Doppler Effect, FMCW radar, factors affecting the radar operation

Unit – 3 : Advanced Radars

MTI radar, Principle of operation, delay line canceller, blind speed, types of MTI radars, tracking radars, types of tracking radar, mono-pulse radar, sequential lobing radar, conical scan radars, low angle tracking, tracking while scan, comparison of mono-pulse and conical scan trackers, MST radars, synthetic aperture radars, principle of operation of SAR, characteristic parameters of SAR, phased array radars, salient features of phased array radars, limitations of phased array radars, advantages of phased array radars, ferrite phase shifters and salient features, PIN diode phase shifters and salient features, laser radars and salient features,

Unit – 4 : Radar Transmitters, Receivers, Signal Detection and Antennas

Transmitters : Types of radar transmitters, radar modulators, transmitter monitoring and testing, radar signal generators, klystron, magnetron, TWT, BWO and solid state devices.

Receivers : Radar receivers, noise figure, mixers, displays, receiver protectors.

Radar signal detection and extraction of information : Matched filters, autocorrelation and crossed correlation, detectors, CFAR, accuracy of radar measurement, uncertainty relation, transmitted wave and ambiguity function, pulse compression, delay lines, target classification with radar.

Radar Antennas : Parabolic reflectors, arrays, slots, horns, microstrip antennas.

Unit – 5 : Fundamentals of Navigational Aids

GPS, ILS, MLS, TACAN, DME, VOR, LORAN, Decca, OMEGA, GCA, PAR, RDF

Text Books

1. Radar Engineering, G S N Raju, IK International Publishers, 2008.
2. Introduction to Radar Systems, Skolnik, McGraw Hill.

DMECE 402 : TV & Satellite Communication

Unit – 1

Television

Basic Television System:

Sound and Picture Transmission, the Scanning Process, Interlaced Scanning, Number of Scanning Lines, Vertical and Horizontal Resolution, Bandwidth of the Baseband Picture Signal.

Unit – 2

Composite - Video Signal:

Video signal levels, Need for Synchronization, Details of Horizontal and Vertical Sync Pulses, Equalizing Pulses.

Signal Transmission and Channel Bandwidth:

AM and FM Channel Bandwidth, VSB Transmission, Complete Channel Bandwidth, Reception of Vestigial Sideband Transmission, Television Standards, Block Schematic study of a typical TV Transmitter.

Unit – 3

The TV Picture Tube:

Monochrome Picture Tube, Picture Tube Characteristics and Picture Tube Control Circuits, Gamma Correction.

Television Receiver:

Block Schematic and Functional Requirements, VSB Correction, Vertical and Horizontal Deflection Circuits, E.H.T. Generation, Study of Video IF Amplifier Video Detector, Sound Channel Separation, Sync Separation Circuits.

Unit – 4

Colour Television:

Principles of Additive and Subtractive Colour Mixing, Chromaticity Diagram, Compatibility and Reverse Compatibility of Colour and Monochrome TV Requirements, Colour Signal Transmission, Bandwidth for Colour Signal Transmission, Sub-carrier Modulation of Chroma Signals, NTSC Encoding (Y, I, Q signals), PAL Encoding (Y, U, V signals), NTSC and PAL Decoders, Types of Colour TV Picture Tubes (Delta-gun, PIL and Trinitron Picture Tubes), Convergence Techniques.

Unit – 5

Satellite Communication

Orbital Aspects, Tracking and Control of Communication Satellites, Launch Vehicles, Propagation Characteristics: Attenuation and Noise, Frequency Bands, Satellite Transponders, Earth Station: Configuration, High Power Amplifiers, Antennas, LNA, Link Design, Multiple Access: FDMA, TDMA, CDMA, SPADE, INTELSATs, INSAT.

Text Books:

1. Monochrome and Colour Television, R. R. Gulati, Wiley Eastern.
2. Satellite Communication, D. C. Agarwal, Khanna Publishers.

Reference Books:

1. Television Engineering, A. M. Dhake, Tata - McGraw Hill.
2. Satellite Communication, T. Pratt and S. W. Bostian, John Wiley and Sons.

DMECE 403 : Digital Communication

Unit – 1

Analog-to-Digital Conversion: Pulse modulation techniques, Sampling, Time Division Multiplexing, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation, Digital Modulation Techniques: Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, Continuously Variable Slope Delta Modulation, Companding, Noise in Pulse-Code and Delta-Modulation Systems.

Unit – 2

Binary Phase-Shift Keying, Differential Phase-Shift Keying, Differentially-Encoded PSK (DEPSK), Quadrature Phase-Shift Keying (QPSK), M-ary PSK, Quadrature Amplitude Shift Keying (QASK), Binary Frequency Shift-Keying, Similarity of BFSK and BPSK, M-ary FSK, Minimum Shift Keying (MSK), Duo-binary Encoding.

Unit – 3

Mathematical Representation of Noise:Some Sources of Noise, Frequency-Domain Representation of Noise, The Effect of Filtering on the Probability Density of Gaussian Noise, Spectral Components of Noise Response of a Narrowband Filter to Noise, Effect of a Filter on the Power Spectral Density of Noise, Superposition of Noises, Mixing Involving Noise, Linear Filtering, Noise Bandwidth, Quadrature Components of Noise, Power Spectral Density of n(t) and n(t), Probability Density of n(t), n(t), and their Time Derivatives, Representation of Noise Using Orthonormal Coordinates, Irrelevant Noise Components

Unit – 4

Data Transmission: A Base-band Signal Receiver, Probability of Error, The Optimum Filter, White Noise: The Matched Filter, Probability of Error of the Matched Filter, Coherent Reception: Correlation, Phase-Shift Keying, Frequency-Shift Keying, Non-coherent Detection of FSK, Differential PSK, Four Phase PSK (QPSK), Error Probability for QPSK, Probability of Error of Minimum Shift Keying (MSK), Comparison of Modulation Systems.

Unit – 5

Spread Spectrum Modulation: Direct Sequence (DS) Spread Spectrum, Use of Spread Spectrum with Code Division, Multiple Access (CDMA), Ranging using DS Spread Spectrum, Frequency Hopping (FH) Spread Spectrum, Generation and Characteristics of PN Sequences, Acquisition (Coarse Synchronization) of a FH Signal, Tracking (Fine Synchronization) of a FH Signal, Acquisition (Coarse Synchronization) of a DS Signal, Tracking of a DS Signal.

Text Books:

1. Analog and Digital Communication Systems by Martin S. Roden, 3rd edition, Prentice Hall, 1994;
2. Principles of Communications By Taub and Schilling

DMECE 404 : Fundamentals of Environmental Engineering

(Common with EEE, Mechanical)

Unit – 1

Module 1 : Introduction

Definition, score and importance, measuring and defining environmental development : indicators

Module 2 : Ecosystems

Introduction, types, characteristic features, structure and functions of Ecosystems, forest, grassland, desert, aquatic (lakes, rivers, and estuaries)

Unit – 2

Module 3 : Environment and Natural Resources Management

Land resources : land as a resource, common property resources, land degradation, solerosion and desertification, effects of modern agriculture, fertilizer-pesticide problems, Forest resources : use and over-exploitation, mining and dams – their effects on forest and tribal people, Water resources : use and over-utilization of surface and ground water, floods, droughts, water logging and salinity, dams – benefits and costs, conflicts over water, Energy resources : Energy needs, renewable and non-renewable energy sources, use of alternate energy sources, impact of energy use on environment

Unit – 3

Module 4 : Bio-diversity and its Conservation

Value of bio-diversity – consumptive and productive use, social, ethical, aesthetic and option values, bio-geographical classification of India – India as a mega diversity habitat, Threats to biodiversity – Hot-sports, habitat loss, poaching of wildlife, loss of species, seeds etc., Conservation of bio-diversity – in-situ and ex-situ conservation.

Module 5 : Environmental Pollution – Local and Global Issues

Causes, effects and control measures of : air pollution, indoor air pollution, water pollution, soil pollution, marine pollution, noise pollution, solid waste management, composting, vermiculture, urban and industrial wastes, recycling and re-use, Nature of thermal pollution and nuclear hazards, Global Warming, Acid Rain, Ozone depletion

Unit – 4

Module 6 : Environmental Problems in India

Drinking water, sanitation and public health, Effects of activities on the quality of environment : urbanization, transportation, industrialization, green revolution, Water scarcity and ground water depletion, Controversies on major dams – resettlement and rehabilitation of people problems and concerns, Rain water harvesting, cloud seeding and watershed management

Module 7 : Economy and Environment

The economy and environment interaction, Economics of development, preservation and conservation, sustainability : theory and practice, Limits to growth, Equitable use of resources for sustainable lifestyles, Environmental impact assessment

Module 8 : Social Issues and the Environment

Population growth and environment, environmental education, Environmental movements, Environment Vs development

Unit – 5

Module 9 : Institutions and Governance

Regulation by Government, Monitoring and enforcement of environmental regulation, environmental acts : water (Prevention and control of pollution) act, air (prevention and control of pollution) act, Envt. Protection act, wild life protection act, forest conservation act, coastal zone regulations, Institutions and policies relating to India, Environmental Governance.

Module 10 : International Conventions

Stockholm conference 1972, Earth summit 1992, World commission for environmental development (WCED).

Module 11 : Case Studies

Chipko movement, Narmada Bachao andolan, Silent valley project, Madhura Refinery and Taj Mahal, Industrialization of Pattancheru, Nuclear reactor at Nagarjuna Sagar, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – aquaculture, Florosis in Andhra Pradesh.

Module 12 : Field Work

Visit to a local area to document and mapping environmental assets – river / forest / grass land / hill / mountain, Study of local environment – common plants, insects, birds, Study of simple ecosystems – pond, river, hill, slopes etc., Visits to industries, water treatment plants, affluent treatment plants.

Textbook : Kaushik – Kaushik, Anubha

Reference : Deswal & Deswal, Raja Gopal, Dharmaraj Publishers,

DMECE 405 : Engineering Economics and Management

(Common for ECE, EEE and Chemical Engineering)

Unit - I

Fundamentals of Economics: Wealth and Welfare Definitions, Robbins' Scarcity Definition; Micro and Macro Economics; **Nature of Economics** –Economics as a social science, Laws of Economics, Assumptions in Economics; **Mixed Economies**; Basic elements of Supply and Demand –Elasticity of Demand and its cases and types, Factors determining price elasticity of Demand.

Unit – II

Industrial Policy of the Government, New Industrial Policy-1991; **Forms of Business Ownership** – Private, Public, and Joint Sector Management; Capital Requirement and Methods of Financing Industry; Cost Concepts – Elements of Costs.

Unit – 3

Evolution of Management Thought (schools of thought); Principles and Functions of Management; Forms of Organization; Decision Making Process; Production Planning and Control.

Unit - 4

Plant Location and Plant Layout; Materials Management; Purchasing Organizations; Inventory Control and ABC Selective Control Policy; Break – even Analysis.

Unit - 5

Leadership – Characteristics, Formal and Informal leaders and responsibilities and qualities of leadership; **Motivation** – Characteristics, importance, and kinds of motivation; **Communication** –Nature, Process, forms, and steps for making communication effective; wages and Methods of wage payment; Industrial Disputes and their Settlement; Provisions of Factories Act.

Text Books:

1. Sharma, S.C. & Banga, T.R., - Industrial Organization & Engineering Economics
2. Dewett, K.K. – Modern Economic Theory

References:

1. Dwivedi, D.N., Managerial Economics
2. Goal, B.S., Production Operation Management
3. Tara Chand Engineering Economics
4. Allen, L.A. Management and Organization

DMECE 406 : Microwave Engineering

Unit – 1 : Introduction to Microwaves and Microwave Sources

Definition of Microwave, Characteristics of Microwave, Advantages of Microwaves, Microwave Parameters, Microwave Regions and Band Designations, Microwave Electromagnetic Spectrum Domain, Applications of Microwaves, Operation of Microwave Devices, Microwave Ovens, Introduction to Tubes, Limitations of Conventional Tubes, Microwave Tubes, Velocity Modulation, Method of Producing the Velocity Modulation, Klystron , Two Cavity Klystron, Parts in Two Cavity Klystron Amplifier, Principle of Operation, Applications of Klystrons, Reflex Klystron, Traveling Wave Magnetrons , Slow Wave Devices, Traveling Wave Tube, Backward Wave Oscillator, Backward Wave Amplifier, Microwave Bipolar Transistor, Field Effect Transistors, Tunnel Diodes, Transferred Electronic Devices (TEDs), Gunn Diodes , LSA Diode , IMPATT Diode , TRAPATT Diode, BARITT Diode, PIN Diode.

Unit – 2 : Scattering, Impedance and Admittance Matrices

Introduction, Properties of Scattering Matrix, Proof of Symmetric Property, Proof of Unitary Property, Definition of Scattering Matrix, Characteristics of S-matrix, Scattering Matrix of a Two Port Network, Scattering Matrix of Multi-port Network, Losses in Microwave Circuits, Return Loss (RT), Insertion Loss (IR), Transmission Loss (TR), Reflection Loss ( ), Impedance Matrix, Admittance Matrix , Summary of S, Z and Y Matrices, Shunt Element in a Transmission Line, S-Matrix of Series Element in the Transmission Line.

Unit – 3 : Microwave Passive Components

Common Passive Components, Two-wire Lines, Rectangular Waveguides, Cavity Resonators, Circular Waveguides, Ridge Waveguides, Attenuators, Corners, Bends, Twists, Circulators, Terminations, Matched Load, Isolators, Directional Couplers, Parameters of Directional Couplers, Scattering Matrix of Directional Coupler, Scattering Matrix of 3 dB Directional Coupler, Tee Junctions, H-plane Tee Junction, E-plane Tee Junction, Hybrid Tee (Magic Tee), Ferrite Devices, Phase Shifters, Hybrid Rings (Rat Race Couplers), Choke Joints, Flanges, Transitions

Unit – 4 : Microwave Integrated Circuits

Introduction, Salient Features of MICS, Types of Electronic Circuits, Discrete Circuit (DC), Integrated Circuit (IC), Monolithic Microwave Integrated Circuit (MMIC), Hybrid Integrated Circuit (HIC), Film Integrated Circuit (FIC), Quasi-Monolithic Integrated Circuit (QMIC), Merits of MMIC, Applications of MMICS, MMIC Materials, Examples of Substrate Materials, Characteristics of Ideal Substrates, Applications and Properties of Substrate Materials at 10 GHz, Examples of Metals (Conductor Materials), Ideal Characteristics of Metals, Applications of Metals, Properties of Common Metals, Examples of Dielectric Materials Used in MICS, Applications, Examples of Resistive Materials Used in MICS, Properties, Methods of MMIC Fabrication, Steps Involved in Fabrication, Transmission Lines in MICS, Fabrication of MOSFET in MMICS, Advantages of MOSFET in MMICS,

Disadvantages of BJT in MMICS, Fabrication of CMOS, Steps Involved in the Fabrication of CMOS, NMOS Fabrication, Applications of MMICs, Fabrication of Passive Components, Design of Planar Resistors, Application of Planar Resistors, Resistance of Planar Resistors, Design of Planar Inductor, Expressions for Inductance of Different Geometries, Planar Capacitors, Hybrid Integrated Circuits (HICs)

Unit – 5 : Microwave Measurements

Introduction, Microwave Sources, Oscilloscopes and Sampling Oscilloscopes, Frequency Meters / Wavemeters, Absorption type Wavemeter, Reaction type Wavemeter, Transmission type Wavemeter, Coaxial Wavemeters, Spectrum Analyzer, Salient Features of Spectrum Analyzer, Applications of Spectrum Analyzer, Power Meters, Network Analyzer, Precautions in Microwave Measurements, Reflex Klystron Characteristics, Characteristics of Crystal Detector, Measurement of Guide Wavelength and Source Frequency, V-I Characteristics of Gunn Diode, Frequency Measurements, VSWR Measurements, Measurement of Attenuation, Measurement of Parameters of Directional Coupler, Study of Magic Tee, Study the Isolator and Circulator, Calibration of Attenuators, Measurement of Unknown Impedance, Microwave Power Measurement, Measurement of Dielectric Constant

Text Books:

1. Microwave Engineering, G S N Raju, IK International Publishers, 2008.
2. Microwave Devices and Circuits, S. Y. Liao, PHI.
3. Foundations For Microwave Engineering, R. E. Collin, McGraw Hill.

DM ECE 407 (A) : CELLULAR AND MOBILE COMMUNICATIONS

Introduction to Cellular Mobile Systems:
A basic Cellular System, Performance Criteria, Uniqueness of Mobile Radio Environment, Operation of Cellular Systems, Planning and Cellular Systems, Analog & Digital Cellular Systems.

Elements of Cellular Radio System Design:
General description of the problem, Concept of Frequency Channels, Co-Channel interference Reduction factor, Desired C/I from a normal case in an Omni-directional Antenna system, Cell splitting, consideration of the components of Cellular Systems.

Interference:
Introduction to Co-channel interference, Real time Co-channel interference, Co-channel measurement, Design of Antenna system, Antenna parameters and their effects, Diversity Receiver, Non Co-channel interference – different types.

Cell Coverage for Signal and Traffic:
General introduction, Obtaining the Mobile Point – to – Point model, Propagation over water or flat open area, Foliage loss, Propagation in near in distance, Long distance Propagation, Point – to – Point predication model – characteristics, Cell site, Antenna heights and signal coverage cells, Mobile – to Mobile Propagation.

Cell Size Antennas and Mobile Antennas:
Characteristics, Antennas at Cell site, Mobile Antennas.

Frequency Management and Channel Assignment:
Frequency management, Fixed Channels assignment, Non Fixed Channel assignment, Traffic and Channel Assignment.

Hand Off, Dropped Calls:
Why Hand-Off, Types of Hand-Off and their characteristics, Dropped call rates and their evaluation.

Operational Techniques:
Parameters, Coverage hole filter, Leaky feeders, Cell Splitting and small cells, Narrow Beam concept.

Reference Books:
Cellular and Mobile Communications by Lee, McGraw Hill.
Wireless Digital Communication by Dr.Kamila Feher, PHI

DMECE 407 (B) : VLSI

Unit – 1

Review of microelectronics and an introduction to MOS technology:
Introduction to IC technology, MOS and related VLSI technology, NMOS, CMOS, BiCMOS Technologies, Thermal aspects of processing, Production of E beam marks.

Unit – 2

MOS and BiCMOS circuit design processes:
MOS layers, ,Stick diagrams, Design rules, and layout, 2 & 1.2 micro meter CMOS rules, Layout diagrams, Symbolic diagram.

Unit – 3

Basic Circuit concepts:
Sheet resistance, Area capacitances of layers, Delay unit, Wiring Capacitances, Choice of layers.

Unit – 4

Scaling of MOS Circuits:
Scaling models, Scaling function for device parameters, Limitations of scaling.
Sub system design and Layout:
Architectural issues, Switch logic, Examples of Structural design(Combinational logic).

Unit – 5

Sub system design process:
Design of ALU subsystem, Some commonly used storage elements, Aspects of design tools, Design for testability, Practical design for test guidelines, Built in self test, CMOS project-an incrementer / decrementer, a comparator for two n-bit numbers.

Ultra fast systems, Technology development, MOSFET based design.

Text books :

1. Basic VLSI Design by Douglas A, Pucknell, Kamran Eshraghian, Prentice-Hall, l996, 3rd Edition.

References :

1. Mead, C.A and Conway, LA, “Introduction to VLSI Systems”, Addison-Wesley, Reading, Massachusetts, l980.

DMECE 407 (C) : Optical Fiber Communication

Unit – 1 : Optical Fibers

i) step-index and graded index fibers, Attenuation and Dispersion ii) Multimode fibers – Attenuation and dispersion iii) Single mode fibers – Attenuation and Dispersion and Design Optimization iv) Fiber fabrication, cabling, splicing and connectionization.

Unit – 2 : Optical Sources

Characteristics of LEDs and LASER Diodes

Unit – 3 : Detectors

Characteristics of PIN and Avalanche Photodiodes

Unit – 4 : Communication Systems

Transmitter and Receiver modules

Unit – 5 : Principles of Fiber

Optic networks, FDDI networks, WDM and Fiber solutions.

Textbooks:

"Fiber Optic Communications Technology" by D.K. Mynabaev and L.L. Scheiner, Pearson Education, Asia, 2001.

Reference :

1. "An Introduction to Fiber Optic systems" by John Powers, 2nd Edition, IRWIN, 1997
2. "Optical Fiber Communications" 3rd Edition, GERD Kaiser, McGraw Hill, 2000.

DMECE 408 : Microwave and Digital Communication Lab

Any twelve experiments

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Directional Coupler Characteristics.
4. VSWR measurements.
5. Radiation Pattern measurements of Horn antenna.
6. Impedance and frequency measurements.
7. Radiation Pattern measurement of Yagi antennas.
8. Sample the given input signal for different sampling rates and recover the signal by means of appropriate low – pass filter.
9. Study the Pulse – Width Modulation for both AC and DC Modulating Signals and obtain the corresponding waveforms.
10. Study the Pulse – Position Modulation for both AC and DC Modulating Signals and obtain the corresponding waveforms.
11. Study the functioning of a given Analog to Digital Converter.
12. Study the functioning of a given Digital to Analog Converter.
13. Obtain the characteristics of the Phase Shift Keying (PSK) Modulator.
14. Obtain the characteristics of the Frequency Shift Keying (FSK) Modulator.

Books:

1. Microwave Engineering, G S N Raju, IK International Publishers, 2008.
2. Antenna Measurement Techniques, G. E. Evans, Artech House.

DMECE 409 : Microprocessor Lab

1)
   a. Write a program, which loads Registers, A, B, C, and D with the same constant. Try to optimize t he program in such a way that the smallest numbers of program bytes are used. Test the program in single step mode. After each step, test the register of interest.
   b. Assume that 4 bytes of data are stored at consecutive locations of the data-memory starting at (x). Write a program, which loads Registers E with (x), D with (x+l), C with (1+2) and A with (x+3).

   a) Assume that l byte of data is stored at data memory location (x). Write a program which tests bit 5 of (X). Write 'FF' in (x+1), if bit 5=0 and write '00' at the same location if bit 5=1.
   b) Write a program which tests the zero-condition of a data byte specified at data memory location (x). If it is zero '00' should be stored at (x+1) location, if non-zero 'FF' should be stored at the same location.
   c) A binary number is stored at data-memory location (x) Compute the number of its logical 1's and store the result at y.
   d) Comment on the instructions used in the above three programs and write about the effect of flags with the instructions used.

2) Two unsigned binary numbers are stored at data-memory locations (x) and (x+1).
   a) Compute the sum of the two numbers and store the result at y, ignoring the possible overflow.
   b) Write a program to compute (x+1) - (x). The magnitude of the result should be stored at (y) and the sign (00 if positive, 01 if negative) at (y+1). Understand the 2's compliment Arithmetic.

3)
   a) A double precision number is stored at (x) and (x+1) (lower order byte at (x). Add another double precision number stored at (y) and (y+1) (lower order byte at (y)]. Store the result at (w) and (w+1).
   b) Same as above: subtract the number (y+1) (y) from (x+1) (x) and store the result at (w) and (w+1).

4)
   a) Two 2-digit BCD numbers are stored at consecutive memory locations (x) and (x+1). Write a program for computing the sum and store the result at loc. (y)
   b) Write a program to compute the difference and store the result at (y).

5) Implement a time-delay loop for the generation of milli seconds. Determine the exact time-delay by adding the states of the instructions executed in the program.

6)

a) Write a program for a decimal counter (00-99) with programmable clock frequency [Eg. Frequency specified at data memory locations (x)] and display the count in the data field using the corresponding monitor subroutine.
b) Reset the decimal counter at a predefined number and start the count again.

7) N binary numbers stored at consecutive data memory locations starting at (x) where N is defined at data memory location 'NUMBER'.
   a) Find the largest number and display it in the data field and arrange them in ascending order.
   b) Find the smallest number and display it in the data field and arrange them in descending order.
8) Two 8-bit binary numbers are stored at data memory locations (x) and (x+1) compute the product of the two numbers using, a). Successive addition method. b). Shifting and adding method store the result in (y) and (y+1).
9) Divide the l6-bit unsigned number in memory location (x) and (x+1) [Most significant byte in (x+1)] by the 8-bit unsigned number in memory location (x+2). Store the quotient in memory location (x+3) and reminder in memory location (x+4). [Choose the data such that the quotient must be contained in 8 bits].
10)

a) A 2-digit BCD number is stored at data-memory location (x). Convert the number into binary and display the result in data field.
b) Convert a binary number in memory location (x) to two BCD digits in memory locations (x+1) and (x+2) [most significant digit in (x+1)]. The number in memory location (x) is unsigned and less than $(64)_H+1$.

11) Write a program to do the operation specified at a data memory location (x). The operations are specified as follows:

    00-Test the parity of the data at (x+1) and store DD for odd parity, EE for even parity at (y).

    01-To operate a staircase lamp, 02-Test the zero condition of the data and store 00 if zero and FF if not, 03-Test if the data is positive or negative.

12) Hardware experiments:
    a) A / D and D / A Converters.
    b) DPSK Modulator and Demodulator.
    c) Seven Segment Display interface.
    d) Keyboard interface.

DMECE 410 : Project