Rajiv Gandhi University of Knowledge and Technology

Basar, Mudhole, Adilabad – 504107

B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

III YEAR I SEMISTER

Code	Subject	L-T	P	C
EC3101	Analog communications	4	-	4
EC3102	RF and Microwave Engineering	4	-	4
EC3103	Digital Signal Processing	4	-	4
EE3101	Linear control system Engineering	4	-	4
BM3001/4001	Managerial Economics and Financial Analysis	4	-	3
BM3101	Personality Development	2	-	1
EC3701	Analog communications Lab	-	3	2
EC3702	RF and Microwave Engineering Lab	-	3	2
EC3703	Digital Signal Processing Lab	-	3	2
EC3901	Seminar-II	1	-	1
	Total	**23**	**9**	**27**

EC3101   Analog Communications

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **4-0-4**

Course Objectives:

1. The concept of modulation and also to analyze continuous / pulse modulation schemes.
2. The design procedure of AM and FM transmitters and receivers.
3. The concept of noise and its effect on modulation schemes and also to estimate the figure of merit.

UNIT-I: INTRODUCTION

Types of information sources, communication channel, Hilbert transform Analytical representation of band pass signals

UNIT-II: MODULATION TECHNIQUES

Fundamentals of analog signals transmission, AM, SSB, DSB-SC, VSB, Ring modulator, FM, PM

UNIT – III: FEEDBACK DEMODULATORS

Phase locked loop (PLL), Frequency compressor feedback demodulation, FM receivers

UNIT – IV:RANDOM PROCESS

Review of probability theory and random process

UNIT – V:BHEHAVIOUR OF COMMUNICATION SYSTEM IN THE PRESENCE OF NOISE

Performance of AM system in noise, Noise in AM and Angle modulation system, Noise in PM and FM modulation system

TEXT BOOKS:

1. A. Bruce Carlson, & Paul B. Crilly, ―Communication Systems – An Introduction to Signals & Noise in Electrical Communication‖, McGraw-Hill International Edition, 5th Edition, 2010.

2. Sham Shanmugam, ―Digital and Analog Communication Systems‖, Wiley-India edition, 2006.

REFERENCES:

1. Simon Haykin, ―Communication Systems‖, Wiley-India edition, 3rd edition, 2010.
2. B.P. Lathi, & Zhi Ding, ―Modern Digital & Analog Communication Systems‖, Oxford University Press, International 4th edition, 2010.
3. Herbert Taub & Donald L Schilling, ―Principles of Communication Systems‖, Tata McGraw-Hill, 3rd Edition, 2009.

4. R.E. Ziemer & W.H. Tranter, ―Principles of Communication- Systems Modulation & Noise‖, Jaico Publishing House, 2001.
5. George Kennedy and Bernard Davis, ―Electronics & Communication System‖, TMH, 2004

EC3102   RF and Microwave Engineering

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **4-0-4**

Course Objectives:

1. To prepare students to understand basic principle of microwave and its applications.
2. To prepare students to understand different microwave components and analyzing different type of junctions used in microwave engineering.
3. To teach the students about various microwave solid state devices and their characteristics.

UNIT-I: Distinguishing features of high frequency electromagnetics

Phase variation, Coupling, Radiation, Transit time effect, Measurements, etc.

UNIT-II:Basic building blocks of Microwave circuits

Transmission Lines, Coupled lines, Resonators, Junctions, etc., Z-matrix, Y-matrix, ABCD matrix, S-matrix, Advantages of S-matrix representation

UNIT-III:

Printed lines& Microwave design

UNIT-IV:Passive Components And Sources:

Directional Coupler, Power divider/combiner, Isolator, Circulator, resonator etc.

Gunn Oscillator, Klystron Power Supply & TWT

UNIT-V:

Applications of microwave engineering And T-R Module

TEXT BOOKS:

1. Microwave devices and circuits-Samuel Y. Liao, Pearson, 3rd Edition, 2003.

2. Microwave principles-Herbert J.Reich, J.G.Skalnik, P.F.Ordung and H.L.Krauss, CBS publishers and distributors, New Delhi, 2004.

REFERENCES:

1. Foundations for microwave engineering-R.E.Collin, IEEE press, John Wiley, 2nd edition, 2002.

2. Microwave circuits and passive devices-M.L.Sisodia and G.S.Raghuvanshi,Wiley Eastern Ltd., New age International publishers Ltd., 1995.

3. Microwave engineering passive circuits-Peter A.Rizzi, PHI, 1999.

4. Electronic and Radio Engineering-F.E.Terman, McGraw-Hill, 4th Edition, 1995.

EC3103   Digital Signal Processing

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **4-0-4**

Course Objectives:

1. To design digital IIR and FIR filters for the given specifications.
2. To learn the basics of Multirate digital signal processing and its applications
3. To learn the DSP processor architecture for the efficient implementation of digital filters.

UNIT-I Discrete signals and Systems:

Discrete signals and Systems in time domain, typical signals, sampling process, discrete time systems(DTS), time domain characterizations of LTI ,DTS classification of LTI, DTS , Discrete time signals in frequency domain -DTFT DFT ,computation of DFT, linear convolution using DFT Z-transform

UNIT-II:

LTI & DTS in the frequency domain transfer functions, frequency response, simple digital filters, all pass functions, complementary transfer functions, digital two pairs, sampling and reconstruction

UNIT-III:

Digital filter structures-Direct, parallel, cascade ladder and lattice for IIR, possible realizations for FIR including polyphase, all pass structures, tunable filters

UNIT-IV:

Digital filter design – IIR using impulse invariant and bilinear transformations, spectral transformations, FIR design using windowing, frequency sampling and computer aids,

UNIT-V:

Implementation considerations

TEXT BOOKS:

1. Digital signal processing, principles, Algorithms and applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 4th ed., 2007.

2. Digital signal processing , A computer base approach- Sanjit K Mitra, Tata Mcgraw Hill, 3rd edition, 2009.

3. Discrete Time Signal Processing-A.V. Oppenheim and R.W. Schaffer, 2nd ed., PHI.

REFERENCES:

1. Digital signal processing: Andreas Antoniou, TATA McGraw Hill, 2006.

2. A Text book on Digital Signal processing – R S Kaler, M Kulkarni,, Umesh Gupta, I K International Publisthing House Pvt. Ltd.

3. Digital signal processing: M H Hayes, Schaum's outlines, TATA Mc-Graw Hill, 2007.

EE3101　　　　　Linear Control System Engineering

Externals: 60Marks　　　　　　　　　　　　　　　　**(L-T)-P-C**

Internals: 40Marks　　　　　　　　　　　　　　　　**4-0-4**

Course Objectives:
1. To acquire the basic concepts of automatic control systems
2. To learn the basics of control systems representations/modeling
3. To learn stability analysis in time and frequency domains.

UNIT – I: INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences-Examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects ofFeedback, Mathematical modeling of physical systems: Differential equation and Transfer functions , Examples of modeling different types (e.g. electrical, mechanical, chemical, biological, social etc.) of systems, Equivalence between the elements of different types of systems. Block diagram algebra –Signal flow graph -Reduction using Mason's gain formula.

UNIT -II : CHARACTERIZATION OF SYSTEMS

Time Domain Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response - Steady state errors and error constants, Frequency domain response -- Transfer function and its interpretation in terms of frequency responses peak and peaking frequency, bandwidth and cut-off rate; Link between time and frequency domain response features. Advantages of closed loop operation: Sensitivity and complementary sensitivity, Disturbance and noise reduction. Effects of proportional, integral, derivative Controls.

UNIT – III: STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability. The root locus concept - construction of root loci- and relative stability using root-locus approach ,effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – IV: STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots-Nyquist Plots-Stability Analysis. Bode diagrams- Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots. P, PD, PI, PID Controllers and Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain,

UNIT – V: STATE SPACE ANALYSIS OF LINEAR CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties.

TEXTBOOKS:

1. Automatic Control Systems– by B. C. Kuo and Farid Golnaraghi – John wiley and son's, 8th edition, 2003.

2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 5th edition, 2007.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 5th edition, 2010.

2. Control Systems Engineering - by NISE 5th Edition – John wiley.

BM3001/4001   Managerial Economics and Financial Analysis

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **4-0-3**

UNIT I: Introduction to Managerial Economics:

Definition, Nature and Scope of Managerial Economics-Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT II: Theory of Production and Cost Analysis:

Production Function - Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs. Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost. Fixed vs. Variable costs, Explicit costs Vs. Implicit costs. Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

UNIT III: Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing. Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing.

UNIT IV: Introduction to Financial Accounting: Introduction to Financial Accounting: Double entry Book Keeping, Journal, Ledger, Trail Balance and Final Accounts (Trading account, Profit and Loss Account and Balance sheet with simple adjustments).

UNIT V: Capital and Capital Budgeting:

Capital and Capital Budgeting: Capital and its significance. Types of Capital. Estimation of Fixed and Working capital requirements. Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals. Methods of Capital Budgeting: Payback Method. Accounting Rate of Return (ARR) and Net Present Value Method, Internal Rate of Return (IRR).

Reference Books:

1. Aryasri: Managerial Economics and Financial Analysis, TMH,2009.
2. Varshney & Maheswari : Managerial Economics, Sulthan Chand,2009.
3. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech. 2009.
4. V.Rajasekarn & R.Lalitha. Financial Accounting, Pearson Education. New Delhi. 2010
5. Suma Damodaran, Managerial Economics, Oxford University Press. 2009.

BM3101   PERSONALITY DEVELOPMENT –I   2-0-1

Guidelines: Learning approach is based on Real time case studies with class room activities

Course Objectives:
1. To develop interpersonal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior.
5. To enhance holistic development of students and improve their employability skills.

UNIT I-SELF ANALYSIS   (6 hours)

SWOT Analysis, Who am I, Personality Traits, Importance of Self Confidence, Self Esteem.

UNIT II-GOALS SETTINGS   (6 hours)

Short term , Long term goal settings, SMART concept
Diversifying Risk and Optimizing Opportunities

UNIT III- TEAM DYNAMICS WITH INTERPERSONAL SKILLS (8 hours)

Team Dynamics, Team Work, Interpersonal Skills

Behavioral Skills GD, PI, Body Language Public Speaking, Verbal, Non Verbal
Communications

UNIT II-CREATIVITY and Rationality   (8 hours)

Out of Box thinking, Idea Generation with creativity

Brain Storming, Effective group meetings, Rationalization of ideas and way to effective
implementation

.Class room and team activities coupled with group tasks depending upon time availability

EC3701   Analog Communications Lab

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **0-3-2**

LIST OF EXPERIMENTS:

1. Amplitude Modulation and Demodulation

2. Frequency Modulation and Demodulation

3. Six diode sampler setup for DAM

4. Single Side band setup

5. Double side band setup

6. Automatic gain control setup

7. Mixer setup

8. Carrier recovery setup

9. Pulse width modulation setup

10. Pulse frequency modulation setup

11. Frequency modulation (VCO & PLL) setup

12. Design and implementation of AM with fc = 1MHz and fm = 1KHz

13. Design and implementation of frequency multiplier circuit

14. Design and implementation of carrier recovery circuit

15. Design and implementation of DSB-SC

16. Design and implementation of mixer

17. Design and implementation of PWM, PFM.

EC3702   **RF and Microwave Engineering Lab**

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **0-3-2**

LIST OF EXPERIMENTS:

1. Familiarization with wave guide components and usage of VSWR meter, slotted line, etc.

2. Measurement of guide wavelength and determination of frequency.

3. Measurement of detector constant _.

4. Measurement of directional coupler such as coupling, directivity, etc.

5. Measurement of radiation characteristics of horn antenna such as radiation patterns and gain.

6. Gunn oscillator measurements such as power versus frequency, I-V characteristics.

7. Klystron characteristics measurement.

8. Impedance measurement and single stub design.

9. Measurement of S-parameters of waveguide T-junction.

10. Measurement of dielectric constant of a sample.

EC3703   Digital Signal Processing Lab

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **0-3-2**

LIST OF EXPERIMENTS:

1. Familiarization with CCS kit with analog I/O and other peripherals.

2. FIR filter design

3. IIR filter design

4. Implementation for real time operation, testing with speech signal.

5. Use of MATLAB for filtering (FIR/IIR)

6. Use of SIMULINK

7. Design of a temperature control system including acquisition of signals.

EC3703   Digital Signal Processing Lab

EC3901   **Seminar - II**

Externals: 60Marks   **(L-T)-P-C**

Internals: 40Marks   **1-0-1**

Objectives:

• To improve the presentation skills

• To prepare PPT more effectively

Student has to chose a topic related socio-economic matter to give a power point presentation